MONTANA OUTDOORS

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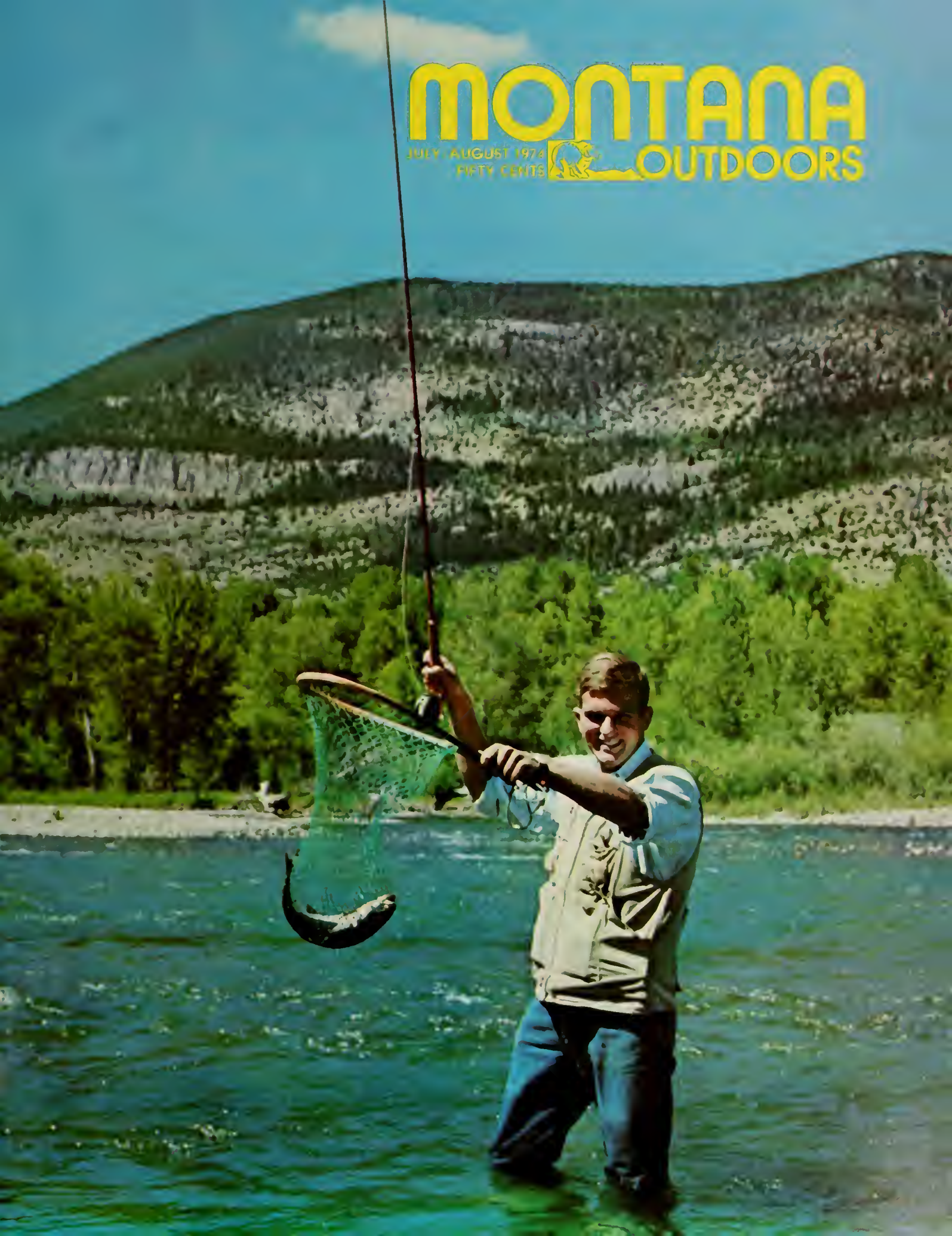

MONTANA OUTDOORS

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state of montana

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the cover

Hopefully, the Yellowstone will always provide quality fishing as pictured on the front cover. Photo by David Sample.

The back cover—Nyack Falls, on Nyack Creek, drains part of Glacier National Park and then empties into the Middle Fork of the Flathead River. Photo by Bill Schneider.

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a livable environment for WILDLIFE is a quality environment for MAN

THE ABSAROKA-BEARTOOTH

The fate of the magnificent Absaroka-Beartooth region will soon be decided. Our department supports a large, unified wilderness, instead of three smaller units separated by corridors—sites of possible roads and other development in the future. However, rather than go into detail here, we present the official statement of Gov. Thomas L. Judge with which we strongly concur.—*Wes Woodgerd, director; Department of Fish and Game*

Located within Montana are some of the most precious acres of wilderness in our nation. These public lands, due to their ruggedness and remoteness, have escaped the evasive inroads of mechanized man and thereby qualify for inclusion into our National Wilderness Preservation System—a protective status which only congressional wilderness classification affords. Once classified, wildlands like that of the Absaroka-Beartooth provide residents and visitors to our state with the unforgettable opportunity to visit and enjoy wilderness areas. Moreover, people throughout the country find satisfaction simply in the knowledge that in this nation there still exist areas where man is only a wayfarer who does not remain as permanent resident. But, most important, wilderness areas offer all of us the opportunity to see America as it once was, thereby preserving a part of our national heritage for future generations.

I take this opportunity to commend the U.S. Forest Service for spending untold hours preparing an inventory of the existing natural resources of the wildlands known as the Absaroka-Beartooth, and for making its findings known to the public. After reviewing the FS proposal and conferring with Montana's natural resource agencies, I respectfully submit Montana's views on the future management of these lands.

I feel that a wilderness classification for the Absaroka-Beartooth region will protect the multiple uses of the area, which include ecosystem integrity, watersheds, recreation, natural areas, fisheries and wildlife habitat. The state of Montana believes that the scenic beauty and natural solitude of this area is of such value that its significance cannot be overestimated. The large and unbroken expanse of the Absaroka-Beartooth Wilderness Area represents a variety of land forms and life forms, offering what could possibly be the most spectacular wilderness in this country.

The FS wilderness proposal provides a sound and commendable basis for the necessary revisions which must now take place in the public arena. To this end, the state of Montana supports a wilderness classification for the Absaroka-Beartooth and we recommend the following:

(1) that all qualified lands be classified to provide the maximum wilderness area possible.

(2) that the Absaroka-Beartooth area be classified as one wilderness unit, rather than being fragmented into three separate units.

(3) that Congress be given the opportunity to consider, as a unified whole, all qualified lands within and adjacent to the Absaroka-Beartooth Primitive areas within the 10-year review period provided for in Section 3(b) of the Wilderness Act of 1964.

I have asked the state's natural resource agencies to provide the FS with a specific boundary recommendation prior to the closing of the hearing record on April 30, 1974.

Thank you for the opportunity to present testimony on behalf of the state of Montana.—*Gov. Thomas L. Judge*

(*For more on the Absaroka-Beartooth wilderness proposal, please turn to page 2.*—Ed.)

The Absaroka-Beartooth:

CAN WE KEEP IT ALL TOGETHER?

by Frank Culver

THE ABSAROKA-BEARTOOTH, a captivating collection of towering peaks, tundra plateaus, mountain valleys and rich meadows, dominates Montana's south central border. Characterized by harsh climate, diverse vegetation, abundant wildlife and scenic grandeur, this great block of wilderness perfection has remained mostly untouched by man's destruction. Yet, the vast Absaroka-Beartooth with all its natural wealth is still unprotected. All this could change, however, because the time to decide the fate of the Absaroka-Beartooth is *at hand.*

The Forest Service recently brought the issue up front with its preliminary Absaroka-Beartooth Wilderness Management Proposal. Here, the FS chopped the vast remote wildland into three separate wilderness areas, each separated by convenient corridors—possible paths for future roads and development. This debate—whether to have a large, unified wilderness or three smaller fragments—is presently under way.

But the Absaroka-Beartooth and the controversy surrounding it are hardly new to *Montana Outdoors.* In the March/April 1972 issue, Ruth Koch painted a vivid picture of the Beartooth country. This region, the eastern portion of the proposed Absaroka-Beartooth wilderness, derives its name from a prominent peak appropriately named by the Crow Indians, "Nah-Pit-Sei" (Nah-Peet-Say), or the bear's tooth. She described the Beartooth as a high and rugged land of uplifted rock shaped into mountains by ice sheets and alpine glaciation. Surrounding the austere peaks are seemingly level alpine plateaus of boulder fields, fell fields and tundra turf where nearly every depression in the landscape contains a sequestered lake fed by the perennial snow fields. At the plateaus' edges are glacier-troughed valleys containing tumbling streams often originating in cirque lakes.

The Absaroka country lying west of the Beartooth was described by Bob Anderson in the March/April 1973 *Montana Outdoors.* This area also obtained its designation from the Crow, who respectfully honored this land with their name, the "Absaroka" (the bird people). Although the two areas adjoin, the Absaroka differs in many respects from the Beartooth. It offers more diversity. The valleys of the Absaroka have been broadened by meandering streams; lakes are only occasional; mountains are worn; vegetation is more prolific and diverse, supporting abundant wildlife populations.

In the past, primeval lands like the Absaroka-Beartooth had no protection from man's activities, except their rugged character. However, when modern man attained the capability to overcome these physical obstacles, wild and remote places rapidly began vanishing.

(upper left) A moose enjoys the early morning solitude of Lake Abundance, part of the corridor not recommended for wilderness by the Forest Service. photo by Frank Culver

(lower left) Hiking the Beartooth high country, certainly an always-remembered wilderness experience. photo by Ruth Koch

To prevent their total loss, farsighted Americans like Robert Marshall realized that only careful planning would make possible both "a twentieth century and a primitive world." He and others then persuaded government land managers to restrict roads, settlement and development on some of the few primitive public lands remaining in the United States. As a result, the FS in 1929 began protecting such lands as the 294,000 acres comprising the Absaroka and Beartooth Primitive areas. Unfortunately, only a fraction of the total wilderness lands in Montana and elsewhere were given administrative protection, while the excluded lands remained vulnerable to further development.

Congress, by passing the Wilderness Act of 1964, took an unprecedented step by declaring national policy to "secure for the American people of present and future generations the benefits of an enduring resource of wilderness." A National Wilderness Preservation System was established under the act to be composed of federally owned lands designated by Congress as "wilderness areas." Especially relevant to the Absaroka-Beartooth is a section of the act requiring that all primitive areas must be studied by the FS by September 1974. After suitability or nonsuitability as wilderness is determined, the findings will be provided to the President for submission to congress. Also pertinent is the Presidential authority to recommend alteration of existing boundaries of primitive areas to include addition of any contiguous area of national forest lands predominantly of wilderness value.

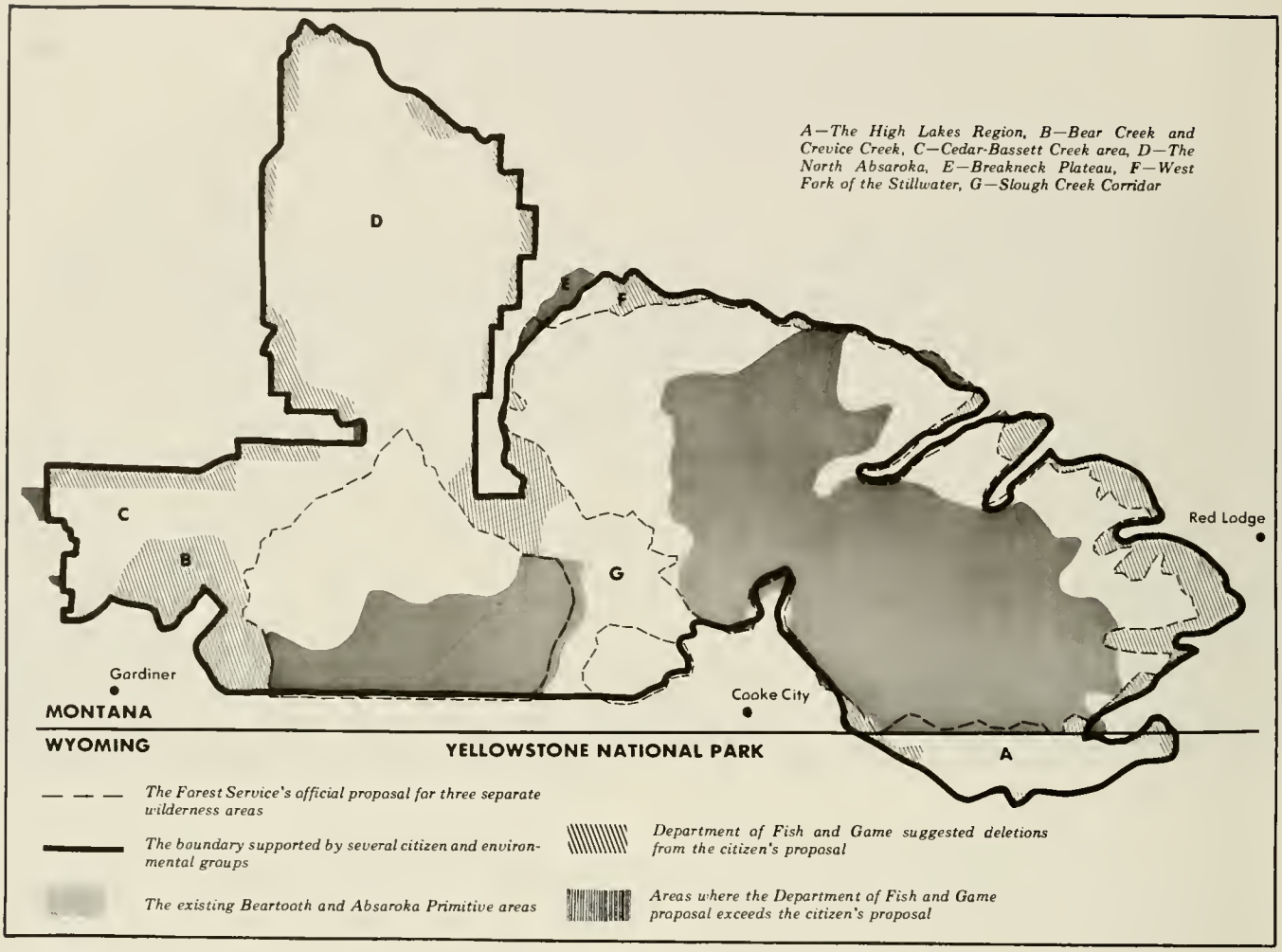
Although the Absaroka-Beartooth country is a single large wilderness of approximately 900,000 acres of national forest land, the Forest Service has recommended that 516,815 acres be fragmented into three units: the Absaroka Wilderness (131,798 acres), the Beartooth Wilderness (373,997 acres) and Cutoff Mountain Wilderness (11,020 acres). (Also an additional 137,377 acres of Yellowstone Park land designated for wilderness lies south of and adjacent to the Absaroka-Beartooth.) Nearly 400,000 acres of qualified wildlands either were not recommended for wilderness or a decision was delayed.

Principally because the FS failed to designate one large individual wilderness, its preliminary proposal received minimal public support. Montana state government (see Director's Column, page 1) and most of the public, as shown by statements presented at recent hearings in Montana, favor a single, large unified wilderness. The proposal, nevertheless, has provided a necessary catalyst for discussion, and more public debate is ahead unless the FS substantially changes the concept of three wilderness units in the final proposal (to be issued this summer).

UNIFIED WILDERNESS AND SLOUGH CREEK

A unified Absaroka-Beartooth depends on classifying the Slough Creek drainage as wilderness. This watershed provides the last remaining link of undeveloped land between the two primitive areas.

continued


A—The High Lakes Region, B—Bear Creek and Crevice Creek, C—Cedar-Bassett Creek area, D—The North Absaroka, E—Breakneck Plateau, F—West Fork of the Stillwater, G—Slough Creek Corridar
D
E
F
C
B
G
A
Red Lodge
Gardiner
Cooke City
MONTANA
WYOMING
YELLOWSTONE NATIONAL PARK
The Forest Service's official proposal for three separate wilderness areas
The boundary supported by several citizen and environmental groups
The existing Beartooth and Absaroka Primitive areas
Department of Fish and Game suggested deletions from the citizen's proposal
Areas where the Department of Fish and Game proposal exceeds the citizen's proposal

Failing to include Slough Creek, the FS set itself up for some heavy criticism—which it received.

The drainage has special wilderness value. Bottomlands are biologically important to many species—grizzly, moose, golden eagles and peregrine falcons—to name a few. Man, too, can enjoy the undisturbed solitude present in the valley and, if so inclined, ponder his relationship to the other species.

In short, the FS decision to exclude much of Slough Creek failed to consider the total value of a unified wilderness.

How did the agency's concept of three distinct units of wilderness originate? Apparently, *not from the public.* In 1971, the FS presented three wilderness management alternatives for the Absaroka-Beartooth during the agency's "public involvement" phase. The reason for presenting alternatives for public review was "to stimulate interest so that the public would come up with its own proposal for management." The three alternatives presented to the public included:

• *Alternative A*—maximum wilderness (a single wilderness within the mineral survey boundary, the Absaroka and Beartooth Primitive areas joined together);

• *Alternative B*—minimum wilderness (wilderness for the Beartooth only, with no wilderness in the Absaroka side), and

• *Alternative C*—maximum development (two areas of wilderness, the Absaroka and Beartooth, separated by development of a road system within the Slough Creek drainage).

The FS concluded that little public support was shown for minimum wilderness (Alternative B) or maximum development (Alternative C). In fact, these two alternatives met with "strong resistance" from the public, and the FS concluded "the majority [public] favors a large area or areas of wilderness."

The favored alternative A embodied maximum wilderness and was presented as one large wilderness joined via the Slough Creek drainage. It is difficult to understand how the FS concluded from public input that "the majority favors a large area or *areas* of wilderness" (emphasis added).

The FS disclosed the concept of three wilderness areas *after* the public involvement process had apparently ended. So FS officials cannot point to public input to support their preliminary recommendation of three separate areas of wilderness and leaving a roaded corridor option open in Slough Creek.

Instead, the following reasoning was used: ". . . the wilderness resource [Slough and Abundance creeks] will be retained [in an administrative

roadless status rather than wilderness status] and at the same time the option for a connecting road through the corridor that may be needed in the years to come to serve transportation needs for recreation, minerals, timber or other resources will remain open."

The FS proposal states that, "There has been no justification shown for the road from the need versus cost standpoint." Nevertheless, this conclusion is dismissed by, ". . . nor has anyone shown that it [the road] cannot be justified economically."

The Yellowstone Park master plan suggests no need for a road. In fact, the National Park Service (NPS) looks *unfavorably* on a roaded corridor because of present vehicle impact problems. Instead, the NPS prefers roadless management for Slough Creek, which is north of and borders recommended wilderness in the park.

Apparently, by leaving the corridor in an easily reversible administrative roadless status, the FS contemplates that the road someday can be justified and built. By this line of reasoning, no area could ever be considered for wilderness since future development pressures could conceivably exist anywhere.

Another reason given for excluding parts of Slough Creek is the presence of a small tract of private land. Unlike the Madison and Gallatin mountains bordering Yellowstone Park in Montana, the mountains of the Absaroka-Beartooth are relatively unfettered by private holdings. Therefore, the opportunity exists to consider an entire mountain range for wilderness without the limiting omnipresent checkerboard land ownership. This is primarily because lands of the Absaroka-Beartooth were part of the Crow Indian Nation's reservation in the late 1800s and were unavailable for private ownership under the terms of the 1864 Congressional land grant to the Northern Pacific Railway Co. Nevertheless, the FS concern for an isolated 416 acres of undeveloped private land in Slough Creek is used as partial justification for not joining the Absaroka and Beartooth.

Ironically, owners of this parcel, known as Frenchy's Meadow, are negotiating with the FS to allow its inclusion into wilderness. The FS, because of exaggerated concern over the influence of Frenchy's Meadow, has nonetheless eliminated from wilderness designation 5,000 acres of adjacent public land. With no substantiation, the agency fears the flat meadow land could become an aircraft runway capable of serving a hypothetical large recreation complex.

Wilderness classification of adjacent public land should not and need not be contingent on the outcome of the Frenchy's Meadow negotiations. Private lands are allowable within the boundaries of a wilderness area, although such holdings cannot be so designated. All *public* lands in the Slough Creek drainage should be recommended for wilderness classification. If negotiations to acquire Frenchy's Meadow are successful, then it too could be classified.

HIGH LAKES

Besides the Slough Creek drainage, the proposal excluded another essential remote section known as the High Lakes, and recommended instead roadless management.

The High Lakes area (29,352 acres) stretches south of the Beartooth Primitive Area, east of Cooke City and north of the Beartooth Highway. It lies mostly in Wyoming. Of relatively moderate to gentle terrain, the area supports both sub-alpine and alpine vegetation. Elevation varies from 8,500 to 10,000 feet. Often covered by glaciation in the past, the remnant undulating topography contains chains of some 32 lakes, many unnamed, supporting excellent fisheries. Wilderness values here are high and accessible to young and old of varying physical stamina. And, visitors can travel to this height via the bordering Beartooth Highway and then negotiate easy trails through unrestrictive terrain.

After Slough Creek, the most contested part of the FS proposal was a recommendation for nonwilderness, nonroaded management for High Lakes. The roadless management proposed would provide an improved trail system and motorized travel (probably by trail bikes, snowmobiles, etc.) to achieve ". . . a greater amount of use per square mile without undue harm to the ecosystems."

Yet, the area already receives much use because of immediate access from a summit road, easy trails and short distances to many of the lakes. Much current use probably can be attributed not only to the area's beauty, but also to limited use by motorized vehicles which encourages wilderness modes of travel by those seeking solitude. Encouraging motorized travel creates a high potential for conflict with wilderness modes of travel and increases disturbance to alpine vegetation and soils that recover very slowly.

Contrary to the FS rationale, the "rough terrain" would be an ineffective control for off-trail cycle use. Much of the terrain is only moderately rugged and is passable by vehicles that might venture off established trails.

The proposal also asks for serious consideration of possible water storage projects on 7 lakes which have a combined 485 acres of water surface. This is a baseless consideration. The FS demonstrates no need for the projects, nor does it weigh the assumed need against the high quality wilderness access the area provides. These 7 mountain lakes would offer only about 5,000 acre-feet of storage, assuming a 10-foot increase in water level and no appreciable increase in surface acres. Development of water impoundment sites and ground water at lower elevations and outside the possible wilderness boundary are certainly viable alternatives. Also, the Wilderness Act states that the President can authorize water developments in wilderness areas.

The wilderness value of the High Lakes area can't be questioned. It features sparkling rock basin lakes,

continued

Mt. Cowen (above), part of the North Absaroka, another section the FS has not suggested for wilderness designation at this time. photo by Bob Anderson

The vast Absaroka-Beartooth is still a stronghold for the mountain lion and other wildlife requiring a remote habitat. photo by Alan Nelson

a variety of alpine ecosystems and land forms and easy access by short hikes from an existing highway. In contrast, the FS fails to provide a single convincing argument for excluding the High Lakes from its wilderness proposal.

NORTH ABSAROKA

An even larger exclusion is the North Absaroka, north of and contiguous to the Absaroka Primitive Area, and between the Yellowstone and Boulder rivers. It offers 220,000 acres of sharp, sawtooth ridges and peaks forming the main Absaroka range. Mount Cowen, highest peak in the range (11,200 feet), and the other precipitous pinnacles exhilarate visitors with unforgettable snow-capped panoramas. This is the most rugged part of the Absaroka. Mountain goats and sheep frequent the craggy peaks and at lower elevations, bear, moose, elk and deer thrive in the protected forests and meadows.

The North Absaroka was examined by the FS concurrently with the primitive area studies. The reason for its exclusion, at this time, is lack of a mineral survey. Although not required by the Wilderness Act, a mineral survey is a self-imposed agency requirement based on a 1963 Congressional committee report. Whether lack of a mineral survey is justification for excluding the North Absaroka from wilderness recommendation is questionable. Instead, the FS could *recommend* the North Absaroka, rightfully allowing Congress to resolve the need for a mineral survey. Furthermore, a mineral survey undertaken soon could possibly be completed before final Congressional action on the region's wilderness classification. Otherwise, the North Absaroka will be considered separately some time in the future, apart from the rest of the region's wildlands.

OTHER EXCLUDED LANDS

Other peripheral lands, part of the total wilderness resource, go unacknowledged in the proposal.

The basins of **Bear and Crevice creeks** lie immediately to the west of the Absaroka Primitive Area. Crevice Creek drains the south flank of Ash Mountain and flows south through adjoining wildlands in Yellowstone Park to a confluence with the Yellowstone River. Bear Creek's upper reaches are primitive and, together with Crevice Creek, form an integral part of the region's wilderness. These areas were orginally delineated in the Absaroka-Beartooth study area and the mineral study boundary, yet no mention of their wilderness potential or eventual management was made by the FS in its proposal.

These drainages should not be overlooked simply because they are peripheral areas. The terrain is moderate and accessible trails are suited for families and others limited to modest weekend trips. Wilderness status would also protect wildlife habitat.

Cedar and Bassett creeks are another westward extension of the Absaroka Primitive Area. These areas, orginally overlooked, are now widely recognized as valuable wilderness, but are not included in the FS proposal.

These drainages support a thriving resident elk herd estimated at 350 and provide one of the few remaining spawning grounds for Yellowstone cutthroat trout. Wilderness protection is essential to assure survival of this prime habitat.

Breakneck Plateau, between the Boulder River and West Fork of the Stillwater, lies mostly outside the FS proposed wilderness boundary. Research conducted here during past years shows that the plateau's lodgepole pine-spruce forest, with open grassy parks and meadows, provides essential elk summer habitat. With increased mining activity immediately to the north providing better access and greater vehicle use in this high and boggy country, elk populations will probably diminish.

About six additional miles of the **West Fork of the Stillwater River**, east of Breakneck Plateau and within the completed mineral study area, could be included in wilderness if the proposed northern boundary was moved north one-half mile. A trail leading to the lake plateau follows this water course its entire length, providing an opportunity to travel for miles along a wild, rushing mountain stream. Tributary valleys, carved by alpine glaciation, join the West Fork from the south, producing classic hanging valleys down which water tumbles in cascading falls from the higher cirque lakes. An exciting spectacle of land forms and wild water awaits both the wayfarer whose destination is the lake plateau or the one-day visitor exploring this stream.

UNIFIED WILDERNESS

Wilderness classification for the Absaroka-Beartooth—one of the last, large remaining expanses of magnificent primitive beauty and diversity—would have significant value to the nation. Meaningful perceptions such as diversity, remoteness, wildness, mystery and solitude are enhanced as wilderness size increases. Indeed, total quality of this land can only be recognized in its entirety as a *unified wilderness.*

Including Slough Creek to connect the Absaroka and Beartooth is a dire necessity. Various contiguous wildlands must also be recognized within this proposal, instead of later on a piecemeal basis.

The FS views the region as a collection of separate wilderness units. But Montanans must work toward a *total wilderness resource.*

Congress will, of course, have the final say. But what is recommended to them will pull a heavy weight. This is precisely why the FS must meet its *total* responsibility and recommend a *total* wilderness. Obviously, the majority favors a large, united Absaroka-Beartooth. And the FS insists its decisions come, partially at least, in response to the "public involvement" phase.

But the burden still falls on concerned citizens. They must continue to push for protection of the Absaroka-Beartooth, until it securely rests as part of the National Wilderness Preservation System.

Vehicle damage to the Bighorn Fishing Access Site, near Billings. F&G photo by John Pearson

DON'T FENCE ME OUT!

ATV Use and Abuse

by Ron Holliday

OUR PUBLIC LANDS—the public domain, national and state forests and parks, and others—have been abused in many ways. Indiscriminate development and logging, overgrazing and poor mining practices have taken their toll. But today, these lands are assaulted by another source—the internal combustion, motor driven vehicle. Since vehicles can't think or reason, the

"assault force" is really people—the vehicle operators.

Certainly public lands do not stand alone. Private lands are under "attack" as well. But private landowners generally control who enters their land and how and to what extent guests "use" it.

The public land manager faces a formidable task because his "area" is often large and remote. Parks and fishing access sites scattered many miles apart make intensive management difficult. And he works with an extremely touchy and often violent element—public land attitude.

For years, people have felt that since public land is truly theirs, they have the right to enter it and do exactly as they please. Many drive as far as possible while hunting, sightseeing or picnicking—habits that are hard to break.

In 1971 and 1972, the department questioned almost 10,000 Montanans and nonresident visitors as part of the Montana Statewide Outdoor Recreation Plan. Most people preferred outdoor recreation opportunity in undeveloped natural settings. Granted, recreationists may continue to enjoy dispersed activities for some time. But total, unrestricted vehicle use is becoming an activity of the past.

"ASSAULT TEAM" MEMBERS

Although all-terrain-vehicles, four-wheel drives and motorcycles receive most of the blame for vehicular land damage, *all* vehicles can cause extensive damage under certain circumstances. In fact, the family sedan on muddy ground can cause as much or more damage than a four-wheel-drive, especially if the four-wheeler has to pull the sedan out.

State parks, recreation areas and fishing access sites receive *most* abuse from ordinary vehicles—two-wheel drive pickups and sedans—plain old cars and pickups.

DAMAGE DEFINED

Repeated vehicle use packs soil tightly and destroys vegetation, especially on steep terrain. Use on wet ground accelerates damage, and mud/snow tires and chains make matters even worse.

Continued vehicle use followed by rain or snow melt often creates severe erosion and large gullies. To avoid going through deep mud holes or severely eroded sections, drivers often go around them, creating widening trails and additional loss of vegetation and topsoil.

Unregulated vehicle use often diminishes recreation opportunity, especially in small, water-oriented sites, such as many state recreation areas. Everybody crowds next to the shoreline, preventing others from enjoying the waterfront and destroying vegetation and topsoil at the same time. Now, park planners usually place parking areas a reasonable walking distance from the water.

FOLLOW THAT TRACK

Light vehicle use in unroaded areas usually causes minimal or no permanent damage, especially if the land is flat and use occurs in dry weather. However, that one track seems to invite others to follow. The sequence begins with an unroaded area; then, *one* vehicle strays from established roads. More and more vehicles follow the same trail until a "road" develops, often with accompanying erosion (see photos).

"LEGITIMATE USE" DEFINED

"Legitimate use" is a difficult—if not impossible—term to define. Certainly, "legitimate use" of a section of desolate public land may be different to an avid cross-country motorcyclist and a wilderness buff. However, the public land manager finds himself caught between differing viewpoints and must decide what is "legitimate use."

Federal land managers received a tough assignment in 1972 when President Nixon issued Executive Order 11644, "Use of Off-Road Vehicles on the Public Lands." The purpose of the order was: " . . . to establish policies and provide for procedures that will ensure that the use of off-road vehicles on public lands will be controlled and directed so as to protect the resources of those lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands."

As a result, many "roads" were closed on public lands which displeased some hunters and other recreationists. However, most closures benefited basic natural resources. And as off-road travel increases, more roads will probably be closed. However, adequate access for hunters and other recreationists is important, so each proposed closure must be individually evaluated.

"The reason we must take care of resources is not for the benefit of the resources, but for the benefit of future generations of people who may be dependent upon them." *—J. Alan Wagar*

The 1973 Montana Legislature passed HB 126 prohibiting hunters from leaving established roads and trails on any land, public or private, except to retrieve downed game. It's possible the law could be amended to make all unauthorized off-road vehicle use unlawful.

The Fish and Game Commission passed regulations prohibiting travel off designated roadways and parking areas in state parks, recreation areas, fishing access sites and game ranges. These regulations are tough to enforce, but perhaps recreationists will cooperate better to curtail vehicle abuse.

However, regulations, laws and prohibition aren't the only answers. Compromises such as opening logging roads for over-

continued

snow use can often be made between users and land managers. Cooperative agreements allowing recreation and restricting vehicles have been successful in a few instances. And better recreation area planning can solve many problems. Department park planners have discovered they can often "give" people much, if not all, of what they want, increasing use of choice areas to near optimum levels. This is often difficult, but the department tries to accommodate as many uses as possible.

In some situations, such as state-owned winter game ranges, no acceptable alternative exists other than prohibiting mechanized vehicles. The harassment factor in this difficult time of year puts additional strain on animals when they can least afford it. Sometimes oversnow machines can pack snow severely enough so animals literally can't get to food. Because of this, snowmobile operators should avoid *all* game concentration areas, public or private.

A single track (above) can have drastic consequences (below) because people tend to follow tracks laid before them. F&G photos by John Pearson

THE REAL SOLUTION

This article could continue listing specific problems and possible solutions. But the major long-range solution lies in *attitude change*. As mentioned earlier, vehicles don't think—people do. Perhaps the current energy situation has caused some people to pause and reflect on their way of life. Perhaps it will cause them to seriously consider other things so long taken for granted—clean air and water, abundant wildlife, beautiful scenery, and the rich variety of outdoor recreation opportunity.

Many people find it hard to accept off-road vehicle restrictions. But after considering what was discussed here, perhaps folks will want to pass this wonderful heritage along to future Montanans. Among other things, they can walk that extra quarter mile while deer hunting (chances are they need the exercise), carry that picnic basket the 200 extra feet from the parking lot to the picnic table and . . . .

Subdividing Flathead Valley

Flathead Tomorrow, a group of concerned citizens, has studied land development in the Flathead Valley for several months. Now, they've published a lengthy white paper on the results. The following is a brief summary prepared by Flathead Tomorrow. A complete copy is available from Flathead Tomorrow, Box 173; Bigfork, Mont. 59911.—Ed.

During the fall of 1973, Flathead Tomorrow, an organization concerned with the future of the Flathead area, formed a committee to assess effects of increasing subdivision activity and a growing population. The goal of this committee was to gather information in four categories and present it in the form of a white paper. The following is a summary of what we found and what we believe.

• **Agricultural Land**. From 1961-1973, approximately 21,000 acres of agricultural land was subdivided in Flathead County. This represents *one sixth* of the acreage in the four most productive classes of agricultural soil (rated by the Soil Conservation Service). Some of the subdivisions were on plats large enough so the land wasn't completely destroyed for agricultural use. Other impacts, such as access roads outside the subdivision, are not included in the acreage figure.

• **Wildlife Habitat**. Over 9,000 acres of big game winter range were subdivided in Flathead County from 1967 to 1973. (Apparently, 1973 was another disastrous year, but complete information was not available when these figures were compiled.) It is important to recognize that species such as white-tailed deer spend the winter on about 10 per cent of their year-'round range. This 9,000 acres of winter range represents an impact on herds which range over almost 100,000 acres during other seasons.

Obviously, the real damage to wildlife will not occur until these lots are developed and occupied, but this is only a matter of time. As with agriculture, some subdivisions are in lots sufficiently large so that not all wildlife habitat will be destroyed. But people, roads, fences and pets—particularly dogs—have a harmful effect on wildlife populations, even on large lots.

• **Floodplain Development**. Efforts to determine the amount of development in the floodplain of the Flathead River were difficult because the political definition of "floodplain" changed. When future floods cause property damage, renewed pressure will no doubt exist to dam another fork of the Flathead River or to dike the river in the Kalispell area.

Such projects would be funded with tax money. We agree with Aldo Leopold when he said, "The floodplain belongs to the river."

• **Life Style**. The life style of people in the Flathead area is probably the core issue. Many citizens expressed their opinions in an attitudinal survey sponsored by several Flathead County agencies in fall 1973. (The questionnaire was objectively designed.)

Seventy-four per cent of the citizens who responded to this survey believed that people were moving into Flathead County too rapidly.

Fifty-four per cent felt land use decisions should result from coordinated efforts between landowners and the community. Only 37 per cent believed such decisions should be made by the landowner alone.

Ninety-four per cent of the respondents believed good agricultural land should be preserved for that use. Both the agriculture and the timber industries were considered necessary to the valley's future. Other industries were also recognized as important by most respondents. But a much smaller percentage of those questioned believed these industries should be expanded.

Only 20 per cent of those who answered believed the Flathead Valley was becoming a better place to live. Twice that number had the opinion that the quality of life in the valley was worsening. Reasons for this pessimistic attitude were not examined in the questionnaire, but we believe it is a result of citizen's realization of the outcome of subdivisions and people filling the valley. We believe a future built on never-ending growth is neither necessary nor desirable for this area. In light of limited land and resources, it is, in fact, illogical.

To critics who say such comments are anti-progress, we ask, progress toward what objective? Certainly, an objective must include a better way of life for the people who live here. Perhaps these critics can show us some examples of a paradise resulting from an endless flow of more people, more money, more development. Would they pick Detroit, or Los Angeles or Lake Tahoe? When life is judged by criteria

continued

other than monetary terms, these examples of Utopia are hard to find. If we are wrong, then why is the Flathead Valley receiving refugees from areas where progress has been the guiding light for so many years?

To those who call our attitude an assault on the individual's rights, we say: Since the first town meeting in New England, the majority has protected its way of life in the United States by restricting actions of individuals and minorities. If this is un-American, then democracy is un-American. The majority rules.

We recognize the need for economic stability and a tax base large enough to assure good schools, adequate public services and representative government. We believe the majority should grant the individual all of the freedoms he wishes, *provided* those freedoms do not force his neighbors into a life style incompatible with the one they have chosen for themselves. Should freedom to pollute be allowed or freedom to force a rural community to give up an agricultural way of life by raising taxes? What about the freedom to misuse land and deny its potential to future generations? We believe individual freedoms must be secondary to decisions of the majority.

We believe there is a capacity, an upper limit, to population and man's developments on the land. A decent way of life is dependent on recognizing this capacity and planning toward that goal. Flathead Tomorrow thinks people in the Flathead want something more than a future with no end to subdivisions, people and development.

If one can compare progress to salting one's food, we believe the time has come to put the shaker back on the table.

CORRECTIONS

In "Stream Access: Watch Your Step" in the May/June 1974 *Montana Outdoors* Catchall, we stated that the "Big Horn River from its mouth to the mouth of the Little Big Horn River" was declared "navigable." This is true. However, the Big Horn River is also navigable from the mouth of the Little Big Horn River to the Montana-Wyoming border.

On page 2 of the May/June 1974 magazine—the first page of "The Subdividers are Still Here"—the photos credited to Bill Cunningham were taken by Lee Werth.

SUMMERTIME CURE-ALLS

Baking soda and vinegar are probably two of the most versatile substances found in the cupboard. They have a multitude of uses in the car, in boats, cabins or on the trail.

Baking soda might be called the outdoor family's cure-all. Its uses include:

(1) relief of indigestion—one-half teaspoon dissolved in a glass of water.

(2) toothpaste—pour some baking soda into your hand and dip a wet toothbrush into it.

(3) mouthwash—dissolve one teaspoon in a glass of water.

(4) deodorant—pat on as you would powder.

(5) shave "cream" for sensitive skin—dissolve three tablespoons in a basin of water. Soda softened water eliminates the need for shaving cream and it's pure and gentle.

(6) sunburn, insect bites, poison ivy and other skin irritations—make a soothing paste of baking soda and water.

(7) car ash trays—put a teaspoon of baking soda in each ash tray. It snuffs out fire and absorbs odor.

(8) freshening ice chests—dissolve a couple of tablespoons of baking soda in water used to wash out the chest. A small container of baking soda kept in the chest will absorb odor.

Vinegar solves many problems occurring in cabins, boats, campers or in the woods. Its uses include:

(1) removal of spots on stainless steel equipment—rub with a vinegar-dampened cloth.

(2) window cleaning—one-half cup ammonia and one-eighth cup vinegar added to a quart of warm water makes a window cleaning solution guaranteed not to streak or film.

(3) sunburned skin—vinegar applied directly to sunburned skin will prevent peeling, if applied immediately after exposure.

(4) sting and itching of insect bites—apply full strength.

(5) improving the flavor of stored water—add one-half teaspoon to a thermos or canteen to enhance the flat, lifeless taste. Plus, by adding a small amount of vinegar, the water will quench thirst faster.

(6) sore throat—gargle with one teaspoon vinegar in one cup warm water.

(7) storage of cheese—cheese will keep longer if wrapped in a vinegar-moistened cloth.

(8) fruit stains—to remove fruit stains from hands, such as those that occur when picking huckleberries, rub the stains with vinegar.

(9) tenderizing meat—tough meat will tenderize if soaked in a *mild* vinegar solution before cooking.

Next time you're away from home, tuck in the vinegar and baking soda. You might even want to check your shelves at home to make sure these substances—with many and varied functions—are represented.

IDAHO GOVERNOR PROTECTS STREAM LAW

Idaho Gov. Cecil D. Andrus has vetoed for the second year a bill to weaken that state's strong stream protection law. The Idaho law actually protects streams from degradation rather than simply requiring that they be considered.

Gov. Andrus said, "I will not permit SB 1485 to become law in Idaho because it strikes down the authority necessary for the Idaho people to protect rivers and streams from unwarranted alteration and abuse.

". . . Idaho's rivers and

steams are the treasures of a resource rich state. Our waters are an example, indeed a showcase, to the rest of the nation. In a land embarrassed by the fouled waters of the Potomac and the Hudson, I cannot stomach SB 1485's attempt to dismantle the stream protection safeguards to Idaho state government."

Conservationists are congratulating Gov. Andrus on his continued firm stand to protect vital resources.—Wildlife Management Institute's *Outdoor News Bulletin*

GRAYLING GETS THE NOD

About 124 readers of *Montana Outdoors* voted for a state fish and tabulations show the Arctic grayling won—fins down.

The grayling, which thrives in 25-30 lakes in the western and south central part of the state, garnered 55 votes (44 per cent). Montana is the only state other than Alaska to support a native grayling population. Habitat degradation and competition from other species have reduced the grayling's waters to the point that the U.S. Bureau of Sport Fisheries and Wildlife includes it in its "Red Book" of threatened fish and wildlife.

Dolly Varden took second spot in the poll with 36 votes (29 per cent) and the paddlefish was third with 12 (9.6 per cent).

Other species receiving support were: cutthroat trout, 9; rainbow trout, 4; lake trout, 3; native trout, 2, and channel catfish, brown trout and mountain whitefish, each 1.

The balloting was generated by an article in the March/April 1974 *Montana Outdoors* in which author George Holton asked "Should Montana Have a State Fish"? Now, it's up to the 1975 lawmakers.

WATCH AUDUBON

Audubon, the official publication of the National Audubon Society, has scheduled two articles of vital interest to all Montanans:

• a long and detailed account of Montana's Missouri River, its resources, attractions and problems. Author John Madson feels strongly that the wild section of Mighty Mo should be protected from artificial impoundment and other pending threats to its natural integrity.

• an equally important feature on the impact of resource development on big game populations in the Rocky Mountain West. Dave Sumner, environmental journalist, does a superb job of weaving the many real threats to big game into one article.

We highly recommend both authors and articles. Reading them will be well worth your time.

ANOTHER FIRST

The Aldo Leopold Memorial Award, top award of The Wildlife Society, was presented to Dr. Lucille Stickel at recent ceremonies in Denver.

Dr. Stickel heads a wildlife research center in Laurel, Maryland, and has numerous scientific publications to her credit. The award was presented to honor her "outstanding service and distinguished contributions in the field of wildlife research and in furthering the cause of sound conservation."

Dr. Stickel is the first woman to receive the Society's highest award.

continued

MONTANA OUTDOORS RECEIVES AWARDS

The American Association for Conservation Information (AACI) has selected *Montana Outdoors* second from a field of 22 state conservation magazines.

AACI is a professional organization of the information sections of state conservation agencies such as the Montana Department of Fish and Game. Most of these agencies have magazines similar to MO.

In addition to scoring second in the general magazine category, a picture essay, "Montana's Many Faces," published in the Nov./Dec. 1973 issue, took second place in the still photography category.

WILDERNESS GATEWAY LIVES

We received a call from Dick Underwood, developer of a controversial subdivision, Wilderness Gateway (May/June 1974 *Montana Outdoors*, page 8). He was quick to point out that Wilderness Gateway *was not stopped*, as we had indicated in that article.

"We are still going ahead with this subdivison," he said. "We're not dead by a long shot."

He also objected to the wording, "a Montanan's nightmare," which was used in the article. "That's bad publicity," he said.

We stated in the article that Underwood had sold the land after a permanent injunction was issued. That is true. However, the buyer, John Miller, was killed in a shooting incident a few months later and Underwood again obtained title to the land.

Disagreeing, Underwood said, "We didn't lose the case. We just didn't want to give up 50 acres for an open area."

He was disturbed because we implied that he had advertised the land as "wildlife range." To our knowledge, he has not published any literature to attract buyers. He couldn't, because the development was never approved. Instead, we intended to point out that the proposed site was in a prime fishing and hunting area and offered other natural attractions.

Underwood also said, "we proved that it was not" an elk calving area, as stated in the article. However, our local game biologist still feels that the proposed development would at least partly intrude onto an elk calving grounds.

DON'T MISS THIS IN SEPTEMBER

In the next issue—Sept./Oct. 1974—*Montana Outdoors* will publish a special photo section called, "Big Game Scenes for Framing." It will include one color photo of each Montana big game species. They will be the very best color photos that we can find—perfect for framing. Don't miss it.

CONSERVATION STAMP GETS TAX EXEMPT STATUS

Anyone who buys a Colorado Conservation Stamp can deduct the $5 from his income tax. Proceeds from stamp sales go to the Colorado Division of Wildlife for support of endangered and nongame wildlife programs.

The Division of Wildlife is, according to the Internal Revenue Service, a tax exempt organization. Therefore, a "donation" made to the organization for any purpose is tax deductible. The decision should interest other state wildlife agencies because many have sought special authority to accept tax deductible gifts.

The Conservation Stamp is prized by stamp collectors, and wildlife officials hope for broader support of nongame programs through stamp purchases. — *Wildlife Management Institute*

SUN POWER

The National Wildlife Federation's *Conservation News* points out a staggering statistic which gives clout to the need for serious government research on solar energy. Enough sunlight falls on the United States in *just two days* to provide sufficient energy to outlast all the country's known reserves of oil, natural gas and coal.

contributors

The future of the Absaroka-Beartooth region in south central Montana will soon be decided. The Forest Service proposes to chop the remote wild area into three separate units. **Frank Culver**, an avid outdoorsman and backpacker asks instead, "Can We Keep It All Together"? He urges Montanans to work for the area's inclusion into the National Wilderness Preservation System as a "large, unified wilderness." Turn to page 2.

Public lands have been carelessly logged, indiscriminately developed, overgrazed and subjected to poor mining practices. In "Don't Fence Me Out!" (page 8), **Ron Holliday** looks at the newest assault public lands face—the internal combustion, motor driven vehicle. Holliday is assistant administrator of the department's recreation and parks division.

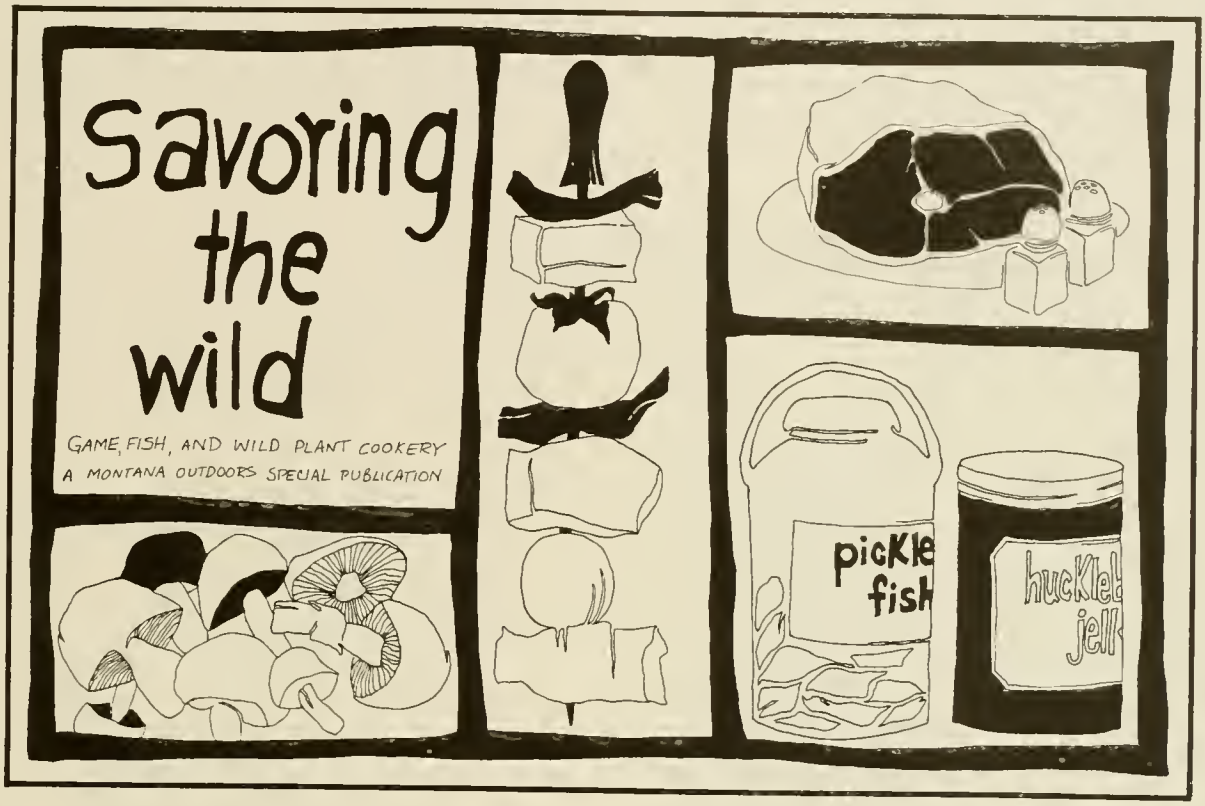
Bob Martinka envisions "The New Horizon" for Montana—one cluttered with thousands of miles of electric transmission lines and blighted with innumerable metal-armed towers (page 16). He questions why Montana's people and wildlife must suffer, just so large urban areas can have cheap electricity. A former planning ecologist for the department, Martinka now heads the Coal and Energy Study.

The Yellowstone is a big river—in spots an awesome one. But demands of a burgeoning energy industry threaten to make its majesty a memory. **Ken Walcheck**, the department's information officer in Miles City, looks at the river from historical, personal and future perspectives in "Weep for the Roche Jaune," beginning on page 22.

Have you ever wondered what made your favorite trout fishing spot better or worse than one which *looked* just about the same? Or, have you ever thought about the reasons why one stretch of a stream has more—and larger—trout than another? **Norm Peterson**, department fisheries biologist, answers these and other questions in "What Makes a Stream Good Fishing"?, beginning on page 35.

Otis Robbins, Jr. looks at the Flathead river system, tracing it from its birth to the many factors that threaten it. Robbins, the department's information officer in Kalispell, points out the interrelationships between the system's parts. His article begins on page 42.

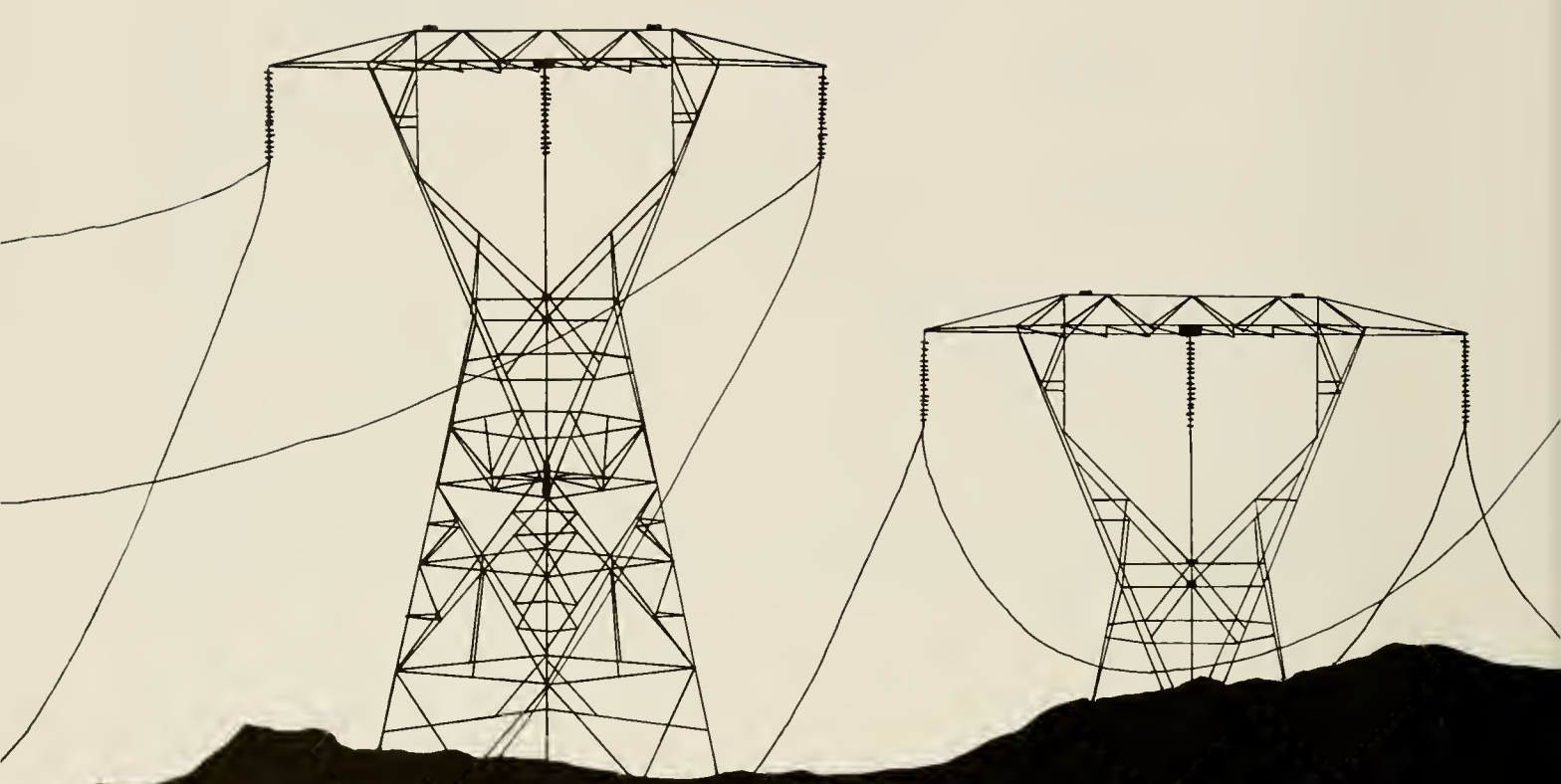
MO would like to thank **Virginia Burns**, whose notes, files and departmental legislative bulletins were invaluable in compiling the "1974 Legislative Roundup."



IF YOU WANT A COOKBOOK WITH LOTS OF FANCY FRENCH WORDS AND HARD-TO-PRONOUNCE INGREDIENTS, THIS ISN'T THE COOKBOOK FOR YOU.

BUT IF YOU WANT A COLLECTION OF COOKING SECRETS FROM MONTANA OUTDOORS READERS AND DEPARTMENT OF FISH AND GAME EMPLOYES, HERE IT IS. IT'S CALLED "SAVORING THE WILD" AND WE THINK IT WILL HELP YOU TO DO JUST THAT. IT CONTAINS SOME TRIED AND TRUE IDEAS FOR FISH, GAME AND WILD PLANT COOKERY--AS WELL AS SOME NEW TWISTS ON OLD FAVORITES. SINCE WHAT YOU DO TO THE CRITTER RIGHT AFTER YOU DOWN OR CATCH IT IS SO IMPORTANT, WE'VE ALSO INCLUDED SECTIONS ON FIELD CARE OF FISH AND GAME. AND THE WHOLE THING—COVER INCLUDED—IS PRINTED ON 100% RECYCLED PAPER, SO IT'S AN ECOLOGICAL PLUS AS WELL.

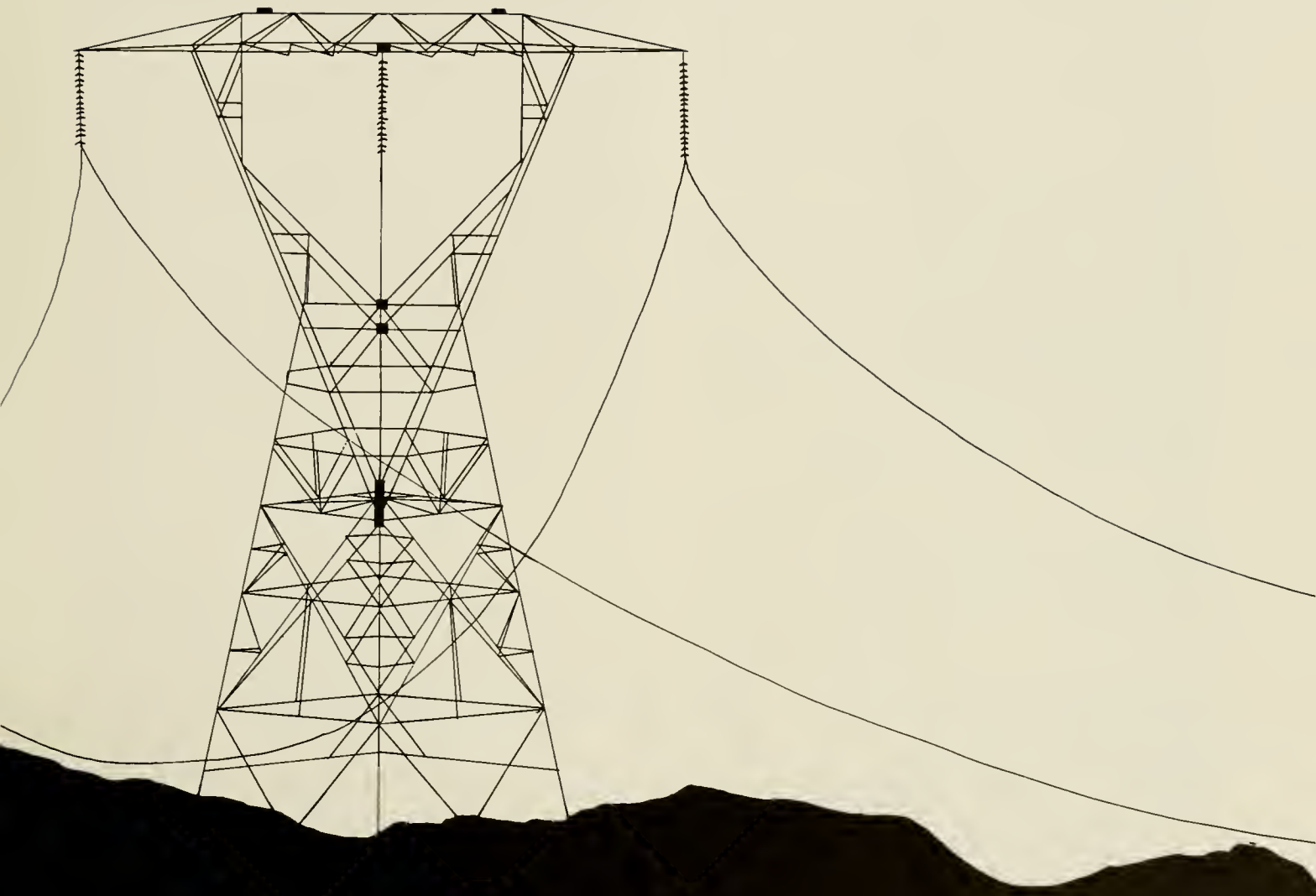
NOW WE'RE SURE THE QUESTION UPPERMOST IN YOUR MIND IS, "WHERE CAN I BUY THIS MARVELOUS COMPILATION OF RECIPES AND HINTS"? WELL, IN TRUTH, YOU CAN'T. BUT SUBSCRIBE TO MONTANA OUTDOORS FOR THREE YEARS OR MORE AND IT'S YOURS—FREE. IN BETWEEN TRIPS TO THE KITCHEN, YOU CAN SAVOR 18 ISSUES OF MONTANA'S INTERESTING, INFORMATIVE, CONTROVERSIAL AND COLORFUL MAGAZINE. INCIDENTALLY, IF YOU DECIDE TO GIVE A THREE-YEAR SUBSCRIPTION TO A FRIEND, BOTH OF YOU RECEIVE THE COOKBOOK. TO ORDER, USE THE MAGAZINE INSERT.



THE NEW HORIZON

brought to you by your friends and neighbors from the energy industry

by Bob Martinka



THE CHEYENNE INDIANS had a window into the future. Many decades ago, they called the white man, "Veho," which in their language means, "the spider." How could they have known that their two-legged "Veho" would soon embark on a towering, web-building campaign throughout Montana?

This "web"—miles upon miles of Extra High Voltage (EHV) transmission lines—is "needed" to meet mushrooming energy demands, not only for Montana, but for the Pacific Northwest and other distant places as well. Whatever undesirable aspects the power lines leave in their wake are Montana's alone, while much (perhaps a majority) of the resulting energy is cheaply provided to far away urban centers.

The source book on the impact of EHV transmission on wildlife and recreation reads like a brand new ledger—very few entries. Thus, the Department of Fish and Game has become vitally concerned about the lines. Much information must be gathered—preferably *before* construction proceeds. All too often technological "advances" prove detrimental to wildlife *after* they are realities and the public can do precious little about them.

To date, "Veho" has crisscrossed Montana with over 7,000 miles of transmission lines (230 kilovolts or less) and one EHV line—a 500 kv line from Hot Springs west to Idaho operated by the Bonneville Power Administration (BPA). This EHV line is relatively new (completed in 1972), and reportedly has *not* carried electricity at full capacity.

continued

Anticipating rapid energy development, the legislature passed the Montana Utility Siting Act of 1973. This legislation requires that plans for large utility plants and related facilities (e.g., power lines) be submitted to the Department of Natural Resources and Conservation for review and approval *before* construction begins. The law gives the Board of Natural Resources and Conservation the authority to approve, modify or deny construction plans after analysis of public necessity and/or environmental impact of the proposed facility.

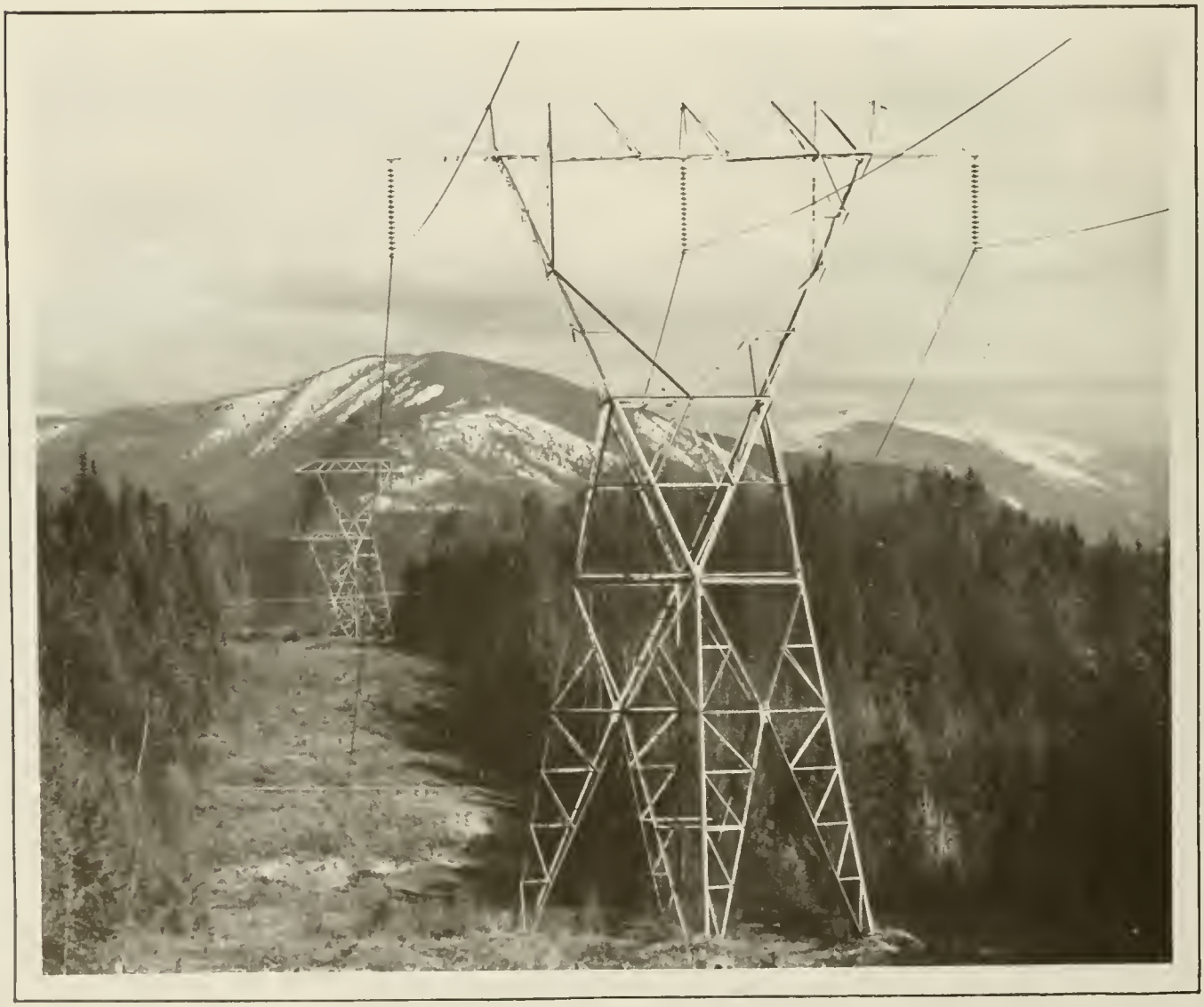
Under this act, the Montana Power Company (MPC) and four other companies applied for several permits to construct lines out of Colstrip. More specifically, they want permission to build:

- a 230 kv "double circuited" line (two 230 kv lines on one tower) between Colstrip and Broadview. These lines will transmit power from Colstrip units 1 and 2 which are scheduled for operation in July 1975 and July 1976, respectively. Eventually, these two lines will be part of the 500 kv system.
- two 500 kv lines from Colstrip to Hot Springs to connect with the BPA line. (One will begin as a 230 kv double circuited line for a short distance—Colstrip to Broadview.) These lines are scheduled for completion in 1978 and 1979.
- a 230 kv line from Billings to Great Falls which would tie in with lines at the proposed Broadview substation.

And, the utility has indicated it will apply for authority to build nine new transmission lines. None will exceed 230 kv, but over 300 miles of corridors will be involved.

Even though a construction permit has not been granted for the double circuited 230 kv line, MPC has proceeded with right-of-way acquisition along *their* proposed route. (The Board of Natural Resources and Conservation may, of course, decide a different route better serves the public's interest.) Apparently, MPC can do this because of a "flaw" in the Siting Act. However, House Bill 1009, passed by the 1974 legislature, partially clears up this flaw.

The Bonneville Power Administration's 500 kv transmission line at Hot Springs. F&G photo by Craig Sharpe



This law includes the beginning of eminent domain proceedings, as used by utilities, in the definition of "commence to construct." Thus, eminent domain can no longer be exercised for right-of-way acquisition until *after* a construction permit has been granted.

The infamous North Central Power Study (NCPS), a report prepared by a consortium of energy companies and the Bureau of Reclamation (U.S. Dept. of Interior), proposed 21 coal-fired power plants for Montana. The combined output of these plants was estimated at 69,000 megawatts. (One megawatt can light 10,000 one-hundred watt light bulbs at one time.)

Development probably won't follow the guidelines enumerated in the NCPS because of a switch in emphasis to coal gasification plants. But 69,000 mw remains as a yardstick of Montana's energy production protential.

A report from the Northern Great Plains Resource Program predicted that eastern Montana could support 15 coal gasification and 18 coal-fired electric generating plants by 2000, assuming the most excessive exploitation comes to pass.

How much of this electricity will be used in Montana? The April 6, 1973 Billings Gazette reported that over 60 per cent of the combined output of Colstrip units 1 through 4 (2,100 mw) would be exported from the state, including 70 per cent of units 3 and 4. According to a study conducted by Westinghouse Environmental Systems, MPC's 1983-4 peak electrical demand will be about 1,521 mw. (Their 1973 generating capacity was 768 mw.) This represents less then *2.3 per cent* of the 69,000 mw generating potential identified by the NCPS. *The figures may vary a little, but it is clear that Montanans will use only a small portion of the power the companies want to produce here.*

But Montanans will get something in return for all this. They will be left with a "giant spider web" of transmission lines. Other "benefits" will include strip mined lands, air pollution, lower stream levels and thousands of new residents.

Most people agree Montana doesn't need *all* this power or *all* these power lines. But still *some* plants and *some* lines will be built. Thus, Montanans must be aware of the problems energy transmission creates.

Carl Anderson, manager of MPC's environmental protection department, describes the impact of EHV transmission as minimal.

"Furthermore," he states, "extensive scientific studies have indicated there is no justification for thinking any living thing—even the most sensitive plants—are harmed by 500 kv power lines passing over them."

continued

Leaking Electricity

Schoolteacher John Miller and a neighbor were painting Miller's barn roof at his farm near Lucasville, Ohio. Wham! The neighbor was almost knocked off his aluminum ladder by an electric shock. In the town of Franklin Furnace, Farmer C.B. Ruggles' son was riding his pony when—whap!—he and the animal were jolted, apparently by electrical charges in the metallic parts of the bridle and stirrups. A housewife in Lucasville turned on the tap to do the dishes—and zap!

The source of the troubles is the Ohio Power Co.'s new "extra-high-voltage" (765,000-volt) transmission line through southern Ohio. It is radiating so powerful an electromagnetic field that an unconnected fluorescent tube would light up. It is all very spectacular, but residents are not amused.

Utilities, on the other hand, are enthusiastic. They hail the 765-kilovolt line as one of their industry's great new developments. The lines not only carry up to 50% more electrical power than conventional 345-kv. or 500-kv. lines, but also lose much less energy in transmission from generating plants to cities—an important consideration in the growing energy crisis. So far, about 1,000 miles of such lines are in operation, mostly in the Midwest and Far West—with thousands more miles of the lines scheduled to be built in the next decade.

Before that happens, people who live along the existing 765-kv. lines feel that a few problems should be worked out. The main one is that the high-voltage alternating current sets up a powerful electromagnetic field that induces voltages and currents in any electrical conductor—generally metallic objects—within about 200 ft. of the lines. In addition, the field ionizes the air (ordinarily a good insulator) surrounding the lines, turning it into a fairly good conductor of electricity. That allows some of the current in the lines to leak off, creating a blue glow around the wires. This happens especially at points where the lines have a flaw (a faulty section of wire, a minor scratch, a coating of soot or pollen) and in damp weather, when air becomes a better conductor. The result: high-tension experiences for everyone in the vicinity of the line.

In a recent survey, 18 families living near Ohio Power Co.'s line reported being shocked by touching farm machinery, wire fences or even damp clotheslines. Two women complained of shocks received while on the toilet. Other complaints were bad TV reception and the sizzling sound of the electrical discharge. Said C.B. Ruggles, whose farm is split by the line: "You'd swear we were living near a waterfall."

While all this is annoying, there is apparently another, even more remarkable effect of the 765-kv. lines. Says Ruggles: "I've noticed that corn won't mature under the line. The ears come out, but they won't mature, and you have to chop them up for silage." In her recent book on the subject, *Power Over People* (Oxford University Press; $7.50), Physicist Louise B. Young gives one possible reason: the discharge of high voltages into the air can produce ozone, a form of oxygen with three (rather than two) atoms in its molecular makeup, and oxides of nitrogen. Ozone can oxidize or "burn" healthy tissue, and nitrogen oxides form nitrous acid and one of the major components of smog. All of these might well affect people and plants that live near the lines.

Ankle Chain. Electric utility officials insist that scientific tests show that the lines are not producing ozone or any other harmful effects. As for the shocks, simply grounding all buildings and fences near the lines will fix that. Schoolteacher Miller, for one, feels that this solution is impractical. When he finally went back to paint his barn, after it was grounded, the power company advised him to trail a metal chain from his ankle to the roof as an additional ground. Miller refused to do that, but, he says, "I painted very, very carefully."

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But not everybody agrees.

First of all, some vegetation destruction occurs in clearing the right-of-way. And such corridors are sometimes maintained with powerful brush-killing herbicides. This often results in erosion, disturbance to wildlife and unsightly views in scenic areas.

However, Bob Amick, from MPC's advertising and public relations office, states that his company will have little control over maintenance of the corridors. "We make an additional payment to the landowner for him to go ahead and take care of the weed problem," he said.

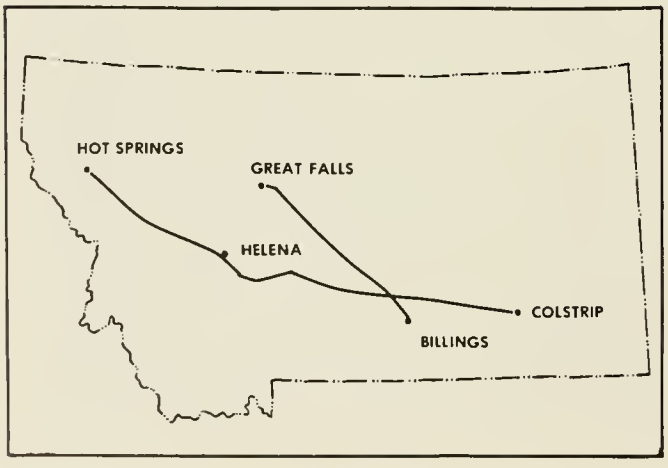
In her book, "Power Over People," (see review, page 34), Louise B. Young calculates that each mile of right-of-way through densely wooded regions requires removal of 10,000 trees. MPC says, "Owners will be paid the commercial value of marketable trees that must be removed during line construction." However, one must wonder which trees are considered "marketable." And what of the future? Thousands of acres will *never* renew their forest resource—like a giant, 426-mile long *permanent* clearcut.

In addition, any article on transmission must mention aesthetics. Already, the ugly metal structures seem almost commonplace, sometimes making it difficult to find a broad vista with no power lines. Will future Montanans know a "Big Sky" without the "webs of progress"? Or, can Montanans look forward to a "New Horizon," when sky and earth no longer meet, unobstructed?

Anderson concedes that the visual impact won't be pleasant. The lines "can't be totally hidden," he admits. "What we have to do is our best to make the line inconspicuous and then weigh the visual impact against the advantages to the public of having adequate supplies of electricity." (Admittedly, hiding a 426-mile series of 146-foot—or higher—towers with 26-foot bases does present a problem.)

A few more ingredients should go into this "weighing." For example, it may come as a surprise to many, but EHV lines *aren't insulated*, because, in theory, air serves as a good insulator up to a "critical" volatage (which varies according to weather, voltage levels, phase spacing, number of conductors in phase, diameter of conductors, etc.) Beyond this point, any increase in voltage or imperfections in the line cause the breakdown of air as an insulator. And when this happens, electricity escapes as "corona discharge," as it's commonly called. This corona discharge causes noise, electric shocks and poor TV and radio reception.

Proposed routes for transmission lines mentioned in this article.



The continuous humming and crackling created by corona discharge becomes loudest during stormy weather. (TV and radio interference also worsen with bad weather.) Noise levels of 70 decibels have been recorded under a 765 kv line in Ohio. At 70 decibels, one must shout to be heard; 85 decibels is the legal limit for industrial noise. *All* persons living under the Ohio line complained about the loud crackling and roaring, and most experienced poor TV and radio reception.

(The difference between 500 kv and 765 kv lines may seem substantial. As the voltage exceeds 500 kv, the impact—noise, corona discharge, etc.—also increases. However, the two lines have some similarities. Unfortunately, the difference in impact of the two lines isn't thoroughly documented. But that only underlines the point that very little is *actually* known about effects of EHV lines and what information is available comes from studies in other places—not Montana.)

In Ohio and other areas, people living near EHV lines received electric shocks from contacting metallic objects because a fairly strong electric field is set up between the wires and the ground. If a metal object, such as a car or farm machinery, enters this field, it takes on a charge. If the object is insulated from the ground (by rubber tires, for example), the charge builds up. Then, when someone touches the object, the charge flows through him and into the ground. And *zap* he receives a shock.

In the Nov. 19, 1973 issue, *Time* described how a schoolteacher who lives near a 765 kv Ohio line was strongly shocked while attempting to paint his barn roof. Ohio Power Co. officials—who still insisted tests showed the lines are not producing harmful effects—came up with a unique solution. They suggested he ground himself by running a chain down his pants leg and allowing it to trail behind him on the barn roof.

MPC confirms that ungrounded objects (e.g. cars) might build up an electrical charge. However, Anderson notes, chances are slim that someone could detect a shock. "If he did, it would be much like the shock a person gets after shuffling across a rug."

In one of the brochures MPC passes out to landowners along proposed routes, the utility offers some interviews with people who live and work near the 500 kv line at Hot Springs. None of these people received shocks. However, this is very misleading—not because of what MPC said, but because of what it *didn't say.*

To determine how much charge will be induced into an ungrounded, metal object, one must first

consider the voltage level in the line, how near the object is to the line (horizontally and vertically) and other variables.

Another problem associated with corona discharge is production of potentially dangerous compounds such as ozone and nitrogen oxides. Some of these compounds, especially ozone, have proved harmful to vegetation and animal life at low concentrations. Scientific studies have shown that injury to plants resulted from exposure to concentrations of ozone as low as .05 parts per million (by volume). Animals subjected to .05 to .20 parts per million of ozone suffered lung tissue irritation and damage. It is not known whether electricity losses from EHV lines will produce sufficiently high concentrations of these compounds to cause damage. However, one Ohio farmer reported his corn did not mature under an EHV line.

Unfortunately, little is known about the effects of EHV lines on wildlife—especially when the lines are operating *at capacity*. Obviously, birds sometimes collide with the wires and towers during stormy weather. Many such fatal collisions have been documented.

Many birds also seem to avoid power lines even when they can see them. A Wisconsin study showed that Canada geese in normal flight *never* flew under power lines, and no geese were known to be shot by hunters within one-fourth mile of the lines. Ducks were less wary, but wariness varied with species. Duck shooting success on private marshes declined by about two-thirds after a power line crossed the area. Shooting was limited to local birds early in the season.

Even more questions remain unanswered about possible effects of EHV transmission on big game. Will power lines hinder deer and elk migrations between summer and winter ranges? Will these animals avoid wintering areas crossed by power lines? Should power companies finance studies to answer these questions before they run rampant with building programs?

Today, many energy companies seem to operate under a "maximum power delivery at minimum cost" creed. To the consumer in large metropolitan areas, this may be a commendable goal. But what about persons in rural areas such as Montana? These persons suffer the consequences of "maximum" economics, which is achieved by ignoring all other considerations. Only rural persons experience the impact on life style and environment. Montana's Gov. Tom Judge summed this up when he said (at the time the Energy Advisory Council was formed in April 1973), "I believe it unreasonable, inequitable, and contrary to national policy and interest, to temporarily feed a nationwide energy appetite by creating social, environmental, and natural resource problems in one region."

"Maximum economy" power lines go up with minimum allowable standards. Larger and more numerous conductors and increased height could probably reduce air pollution and shock danger. These design changes are within present technology—but at extra cost.

Underground lines are seldom considered in this country except in large cities. The reason? They cost 5 to 15 times more than overhead lines. The technology for constructing underground lines has not progressed very rapidly in this country, but at least one foreign country uses underground lines (New Zealand). Although initial land disturbance in this type of construction may be somewhat greater than with above ground lines, the long-term benefits far outweigh the short-term problems—except economically.

Another alternative is converting from alternating current (AC) to direct current (DC). Again, this would be more expensive and the needed technology has not been thoroughly researched. But this type of system requires one less conductor per circuit and more current can be carried per conductor.

The last—and perhaps best—alternative is not to build the electric generating complexes that require these spider web transmission systems in Montana. Must Montana's people and wildlife endure these monstrous power complexes so large population centers can have cheap electricity? Lt. Gov. Bill Christiansen recently suggested MPC plans to sell "the cheapest power in the world" to its Pacific Northwest energy partners in the Colstrip generating complex. If the Northwest wants cheap electricity, let it also have the ugliness, air pollution, dry streambeds, giant power plants, socio-economic problems *and transmission lines* that accompany electricity production.

Perhaps these problems are already so prevalent that a few additions will go mostly unnoticed. But should Montanans be forced to sacrifice their quality way of life and surroundings to keep the lights of megalopolis burning?

Next Time

Watch for these features in the Sept./Oct. 1974 issue of *Montana Outdoors*.

- —big game scenes for framing
- —the moose
- —fee hunting
- —strip mining in the Flathead ?
- —the hunter's moon
- —wilderness survival

THE COVER STORY

the Yellowstone River:

WEEP FOR THE ROCHE JAUNE

by Ken Walcheck

IT WAS OVER 20 years ago, but still I can hear the exuberant voice of one of my traveling companions as our sputtering rumble seat vintage car coasted down a dusty, washboard road. It ran parallel to the Yellowstone River in the vicinity of Yankee Jim Canyon. "The river!" he shouted. "Look at that fabulous river!" None of my earlier experiences in Montana quite prepared me for the one I shared with my Wisconsin companions that June day. We parked the car on the shoulder of the pebble-strewn road and stared at a brilliant green world of swift currents and stinging spray as the big waves crested and broke over exposed rocks.

As we stared at the river, a large, bright yellow raft carrying several people surged around the upstream bend. The raft bounced over the big waves, water splashing over it, and the riders paddled with all their might to stay right-side up as the swift current carried them through the rapids. Here was an extraordinary spectacle. I felt myself shrinking inside before the scale of the scene, not fully realizing that I was looking at a resource that I had never experienced before.

The majestic Yellowstone River at the Allen Spur dam site, near Livingston. photo by Mike Sample

The Yellowstone River—from its source in Yellowstone National Park, Wyo. to its confluence with the Missouri River in North Dakota—represents one of the last major rivers in the continental United States functioning as a free-flowing system and blending harmoniously with its surrounding environment.

The sinuous ribbon of water teems with colorful history. It served as a major artery of commerce and guided explorers and trappers into a hostile and uncharted wilderness. It carried Indian bull boats, pirogues, Mackinaws, flatboats and steamers. It witnessed the passage of brigades of soldiers, miners, sod busters, cowboys, gamblers and painted ladies traveling to new horizons.

The Yellowstone is a big river, in spots an awesome one. It courses some 671 miles and pours almost four trillion gallons a year into the Missouri. Which spectacular and scenic vista of the Yellowstone one prefers depends on past exposure to the river. For some, it's the upper cool, green reaches running through steep-walled canyons; for others, it's a wide river bottom in eastern Montana with wind-swept yellow rimrocks and bluffs.

"Roche Jaune" is French for "Yellowstone."—Ed.

continued

For some Montanans, such vistas existed in the shadows of Death Row until recently. They believed the free-flowing Yellowstone faced a disgraceful destruction because of coal-related water development.

OLD KING COAL

The purity and power of Montana coal in the Yellowstone Basin is not a new discovery. The original "Journals of Lewis and Clark" contain an entry for July 28, 1806, by Capt. William Clark describing a site somewhere between Armell's and Porcupine creeks in Rosebud County.

"The clifts on the South Side of the Rochejhone [Clark's spelling of "Roche Jaune"] are Generally comp. of a yellowish Gritty soft rock . . . Straters of Coal in the banks on either Side those on the Star. Bluffs was about 30 feet above the water and in 2 vanes from 4 to 8 feet thick, in a horozontal position. the coal contained in the Lar Bluffs is in Several vaines of different hights and thickness. this coal or carbonated wood is like that of the Missouri of an inferior quallity."

It's rather ironic that, 168 years later, a skyrocketing demand exists by an energy-hungry nation for this "inferior" coal. There's also a bit of irony because this area—so vividly described by Clark—is now Nichols, site of the first pipeline that will convey part of Roche Jaune's water to energy conversion plants at Colstrip.

Water requirements for development of the Fort Union coal deposits have fluctuated widely during the past two years. The Bureau of Reclamation's (BuRec) appraisal report on Montana-Wyoming aqueducts estimated that up to 2.6 million acre-feet per year (MAFY), or one-third of the annual flow of the Yellowstone, would be diverted. We now know that the BuRec's estimate was slightly conservative.

REQUESTS FOR WATER

Here's a run-down (March 1974) on water demands, both on the Yellowstone and on its major north-flowing tributaries across eastern Montana's coal fields.

Six requests have been made since November 1973 for industrial reservoirs to store 359,738 acre-feet from the Tongue, Yellowstone and Powder rivers. They fall under the 1973 Water Use Act and must await answers to legal questions before the Dept. of Natural Resources can officially consider issuing permits. For example, permits on the Tongue and Powder rivers are in question until a check of water rights is completed and long held agricultural water rights are specified and settled.

Add the above requests to the 736,000 acre-feet already claimed under previous water laws, and the total is over one million acre-feet (MAF).

In addition, another 2.2 MAF are under option or have been requested from BuRec reservoirs in the Yellowstone River Basin. Thus, the total planned for industrial use is almost 3.3 MAF.

According to the Missouri River Basin Comprehensive Framework Study (Vol. 1, p. 70), agriculture in the Yellowstone Basin uses approximately 2.4 MAF of water a year to irrigate 1,423,000 acres of land. The same study (Vol. 6, p. 56) lists an additional 2,290,000 acres in the basin suitable for irrigation. Couple industrial-agricultural uses with domestic-municipal uses, and it's easy to understand why some people think the Yellowstone might come out on the short side.

EFFECTS OF DIVERSIONS

What effects will these massive diversions have on the Yellowstone? First, the river's capabilities must be determined by examining its flow patterns.

Bob Anderson, former staff member of the Environmental Quality Council, developed low flow probability hydrographs from data gathered and published by the U.S. Geological Survey. (A hydrograph is a method of displaying flow measurements of water.) The charts clearly indicate some severe environmental impact if all options and applications for water are realized.

The importance of Anderson's conclusions is emphasized by examining one of the Montana Power Co.'s "educational" ads, widely circulated in the news media last year. Remember the ad in which a large glass graduate, filled with water, represented the Yellowstone River? MPC wanted to use a "teaspoon" (8,000 gallons per minute [GPM] or 13,032 acre-feet per year [AFY]) of the "one cup" of water —representing the low historical flow of the Yellowstone at Forsyth (375,000 GMP or 605,264 AFY)—for its first two power plants at Colstrip. The short-term objective of the ad apparently was to persuade increasingly concerned and confused Montanans that dipping a few bucketsful out of the Yellowstone was really no problem. The ad was less than candid in "telling it like it is." (See facing page.)

Opponents will quickly point out that the graduate implies that only 3.6 MAFY, or less, flows past Sidney 365 days a year when it's really 9.4 MAFY. Or, you can't take monthly flows and convert them to yearly estimates.

This kind of thinking is dangerous for two reasons. First, average flow figures per season are misleading because one must look at historical low flow figures for a realistic appraisal when talking about large water withdrawals. For example, in 1934 the annual discharge at Sidney was only 4.21 MAFY; in 1940, 5.2 MAFY, and in 1961, 4.26 MAFY. The diversion of water in the magnitude previously mentioned paired with historical low flows or seasonal critical flow periods will affect water quality in many ways —for example, higher temperatures, increased salinity and increased concentrations of organic wastes presently diluted by existing flows. These changes could influence:

- life histories of fish, aquatic invertebrates and aquatic plants,
- growth and reproductive rates of preferred (such as trout, paddlefish) and undesirable (such as carp, suckers) fish, possibly giving the latter a competitive advantage and resulting in changes in relative abundance of preferred and undesirable fish species,
- growth rates of aquatic plants such as algae, thereby enhancing seasonal production and resulting in nuisance blooms and taste and odor problems and
- reducing diversity in the aquatic community.

Those who study river systems understand that the aquatic ecosystem has been subjected to nature's experimentation and selection for millions of years. These river systems have adapted to natural high and low flows, but *not* to the increasing extremes that massive withdrawals inevitably will cause.

In addition, look at other withdrawals from the viewpoint of a Glendive irrigator such as Willie Day, member of the Buffalo Rapids Irrigation District: "The greatest demand on our project is from the last week of June until the middle of August. As you can see, average flow figures per season do not do us a bit of good. You can average the air you breathe per year too, but have it shut off for five minutes during that time and the result would be the same as missing a month's water on our project. Even small industrial diversions would hurt us drastically without supplemental flow regulations."

continued

If we're going to lay our cards out on the table, why not lay them all down and look at the entire water withdrawal spectrum rather than just a small fragment? We can easily do this by using the same graduate and phrasing that MPC did. For example:

2,045,635 gallons of water per minute (3.3 MAFY) for energy conversion plants in Montana . . . that sounds like a lot of water. But just how much is 2,045,635 gallons a minute?

Each minute an *average* of 5,800,000 gallons of water (9.4 MAFY) in the Yellowstone River flows from Montana into North Dakota . . . about 3 times as much as will be used by projected energy conversion plants.

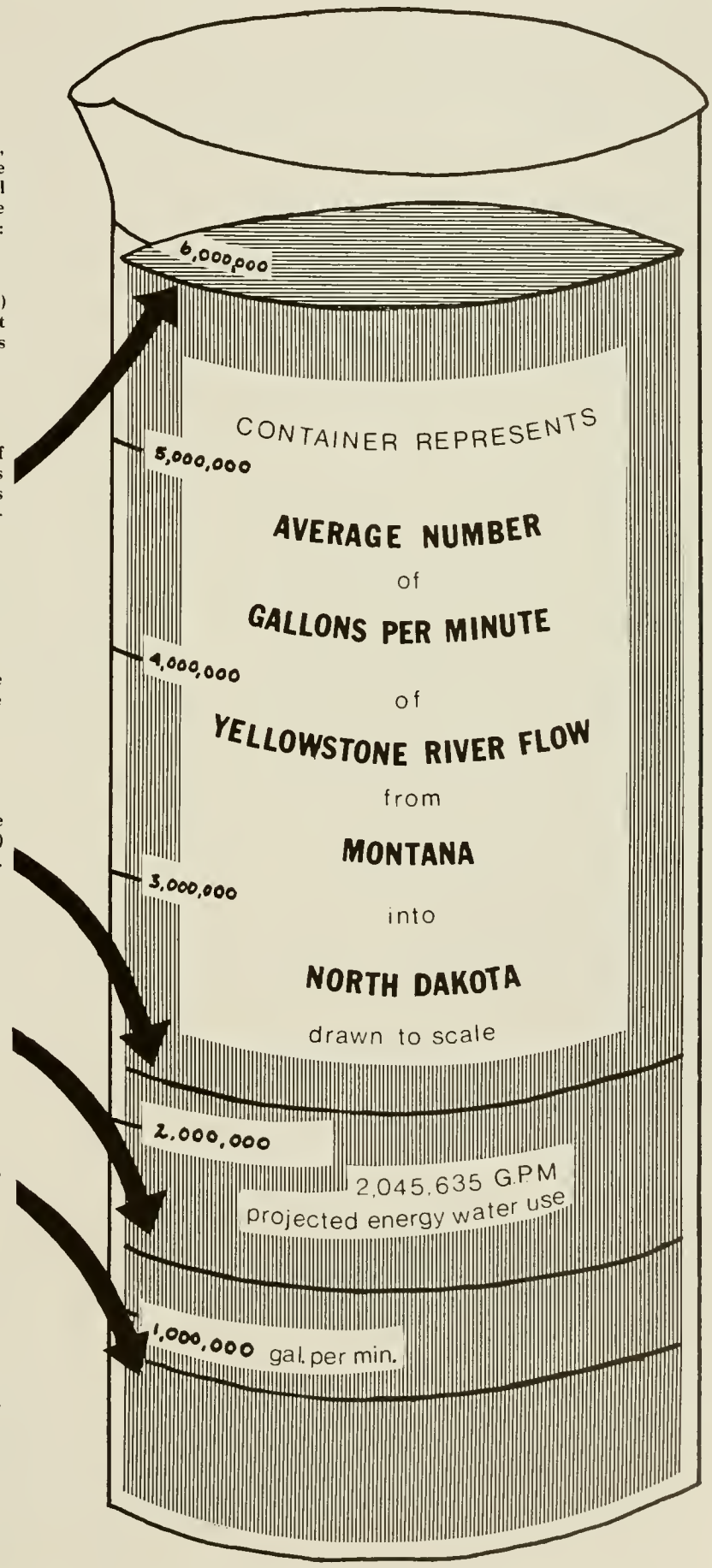
Note, we said the *average* flow. It would be a little unfair to talk about average flow figures since we should consider critical *low flow* periods.

For example, at Sidney on Jan. 1, in an average year, the average flow (which lasts about a month) is about 2,244,000 gallons per minute (3.6 MAFY).

About 25 per cent of the time, the flow at this same date averages about 1,615,680 gallons per minute (2.6 MAFY) or less.

About 10 per cent of the time, the flow at this same date averages about 897,600 gallons per minute (1.4 MAFY) or less.

What effect will massive diversions have on these flow patterns? A glance at our container clearly shows that the Yellowstone often does not have that much water. If all options and applications for water are realized, it should be quite obvious—even to the most casual observer—that we won't have to worry about losing any water to downstream states because there won't be any to lose.



White-tailed deer haunt the Yellowstone's bottomlands. photo by Alan Nelson

THE ENERGY THREAT

Obviously, some lessons worth learning are taught by energy company advertisements. The threat of an energy crisis serves as a formidable weapon to stampede water administrators, legislators and an alarmed public to accept industry's "solutions" to the problem—such as junking many environmental safeguards that are thorns in the energy producer's pocketbook. So, regardless of how vocally or how often the energy czars tell us they have the public's interest at heart, concerned citizens would do well to keep in mind the words of one of Mobil Oil's highest officials from an interview last fall (as reported by *Consumer Reports*, Feb. 1974): "We are a profit making concern. We ought to be trying to get the most attractive rate of return on the money that our shareholders have given us. We are trying to make a profit."

The article goes on to say ". . . whenever you see an oil company advertisement 'telling it like it is,' remember the words of a leading investment advisory service: 'The U.S. energy shortage should have favorable implications for oil company earnings'."

For years, Montanans have been raised on the doctrine "use it or lose it." Consider a statement made by one federal offical at a 1973 public forum on coal and energy development. "The more than 8 million acre-feet annually leaving the Basin [Yellowstone] belongs to Montana and Wyoming. One question arises as to why these two states would want to sit by and watch it flow away to other downstream states. If they do, the only answer can be that they don't understand the value of water." This philosophy holds that Montana must put its water to use within its own boundaries, or surrounding states—with greater needs and political power—will simply "dry up Montana."

Replies to this type of thinking are varied and numerous. Who has the best answer? Probably Lt. Gov. Bill Christiansen does. In a speech at the Lower Yellowstone River Workshop in October 1973, he said, " 'Use it or lose it' as a slogan is dead. Today's slogan drafters will have to try harder and do better. Montana now wants to know: Use it to do what and for whom? Use it to develop? Tell Montana what you would have us develop into. Development and growth are no longer synonymous with human progress and fulfillment."

What is gained from maintaining a free-flowing Yellowstone? How can you measure it—by what slide-rule do you calculate the river's numerous attributes? To *say* that we would retain a unique river system, incorporating plant and animal communities, historical and archaeological sites, geological features of extraordinary scenic and scientific merit, plus the river itself, with its opportunity for recreational pursuits, marks only the beginning.

BuREC POLICIES

The BuRec—praised and condemned for its efforts to bring water to arid western farmlands—no longer sees irrigation as its top priority. Instead the federal agency has shifted its emphasis, as pointed out by Gilbert G. Stamm, federal commissioner of reclamation. "Recently we are making a very definite and deliberate shift in emphasis to power and to providing municipal and industrial water. Producing more electricity and providing municipal and industrial water is where the greatest need is."

In response to industry requests, the BuRec began issuing industrial water options in 1967. Under this program, the Bureau optioned water from reservoirs on the Yellowstone River tributaries to 18 oil and mining companies.

A classic confrontation is emerging, pitting goals of industry against the values of some Montanans who want to preserve the viability and grandeur of the Yellowstone. "Indecisiveness" will continue to siphon off more and more Yellowstone water to construct energy conversion plants. The confrontation resembles showdown poker. With each

continued

(top) The Yellowstone offers fishing for all ages. photo by Bill Eaton. (middle) The Yellowstone Basin supports a large portion of eastern and south central Montana's economy. photo by Joe Halterman. (bottom) Canoeing the Yellowstone leaves one with a deep satisfaction knowing the mighty water course still exists as a continuous, free-flowing aquatic system. photo by David Sample

additional plant and each additional water withdrawal, a *critical* depletion becomes even more likely. Regulation of the Yellowstone would then be necessary to prevent irrigation and energy disruption during predictable low flow periods. At this point, Montanans could be painfully divided on whether to allow construction of Allen Spur Dam.

ALLEN SPUR CONTROVERSY

Nobody knows when talk about Allen Spur began, but it has been a

protecting the upper Yellowstone

—see page 31

controversial issue for as long as some residents can remember. The proposed dam site on the Yellowstone near Livingston represents the "best" remaining dam site in Montana, according to the BuRec's aqueducts report. Allen Spur could guarantee 1.7 MAFY for downstream industrial use.

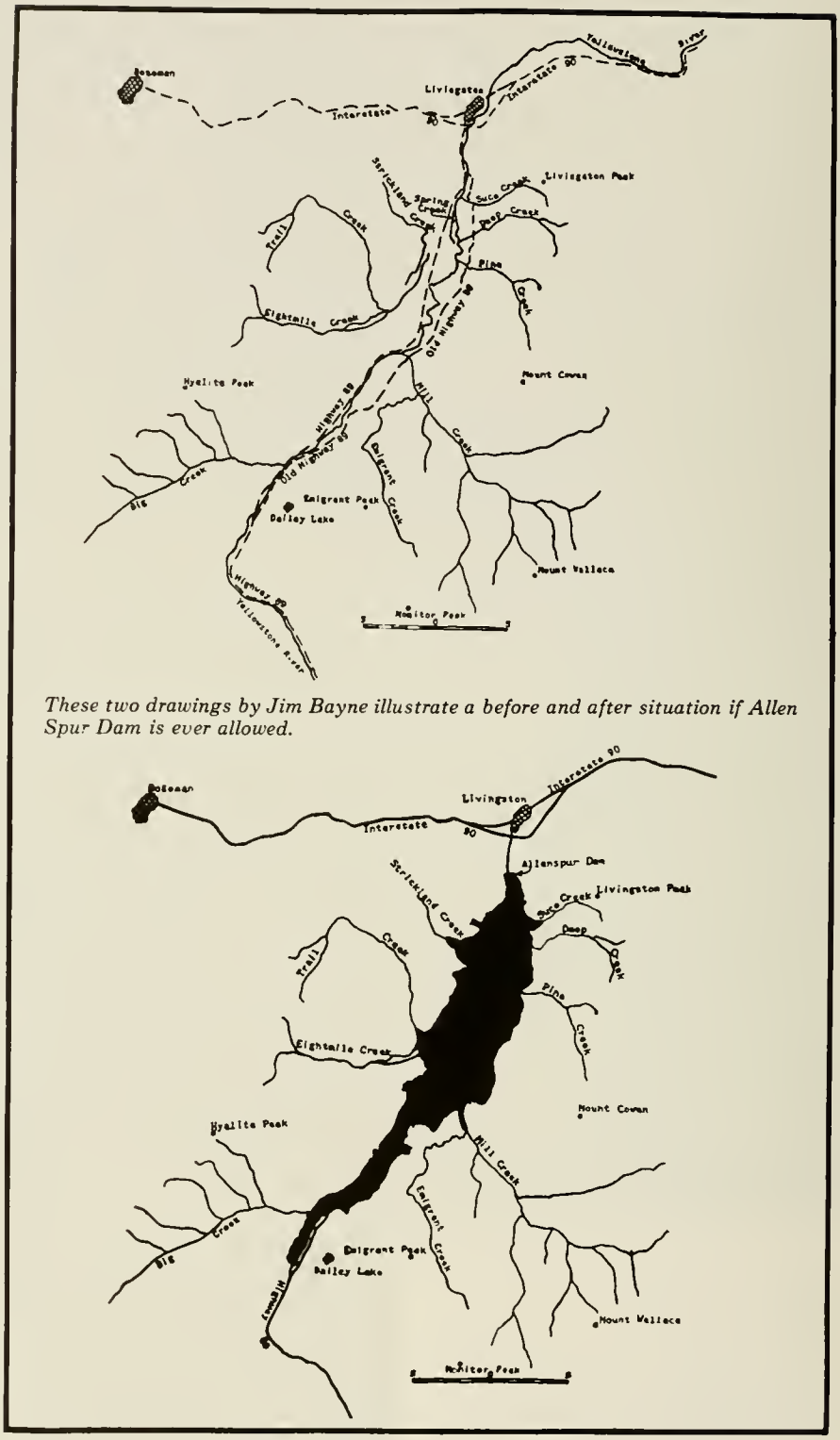
Mention of the word Allen Spur in Livingston and other areas signals a call to arms—a rallying point for those who have dedicated themselves to fight for a free-flowing Yellowstone. Construction of Allen Spur would produce a massive impact and a wide range of environmental changes. (For an in-depth look at Allen Spur, see "Be Glad You Aren't An Antelope," in the March/April 1973 *Montana Outdoors*.)

LEGISLATIVE BATTLES

Battlelines for protecting the Yellowstone have formed along several fronts during the past several months. There would be little point in detailing the long struggle to keep the energy monoliths from completely dewatering the Yellowstone. The struggle has just begun. Here's what transpired during the 1974 Montana Legislature:

• HB 892, "Pastoral and Scenic Rivers Act." Remember the explosive "Wild and Scenic Rivers Act" (HB 133) held over from last year's session? It was reworked into a form more palatable to highly skeptical farmers and ranchers. The watered down version did not receive much support because it lacked controls and safeguards present in the original bill. (killed in committee—Feb. 20, 1974)

• HBs 835 and 836, "Water Rights." HB 835 would have established a priority list for Yellowstone water use, and its companion HB 836 dealt specifically with maintaining minimum flows in the Yellowstone River and tributaries. (left in Natural Resources Committee)



These two drawings by Jim Bayne illustrate a before and after situation if Allen Spur Dam is ever allowed.

• HB 865 would have authorized establishment of scenic river areas by the Board of Natural Resources and Conservation. (killed on second reading—Feb. 16, 1974)

• SB 722 would have authorized the Yellowstone River Park System to preserve the Yellowstone River in a free-flowing state from Gardiner to Big Timber. (left in Natural Resources Committee)

• Senate Joint Resolution 42 urges that the Secretary of the Interior recommend to Congress that the Allen Spur dam project on the Yellowstone River be denied authorization. (signed by governor)

We can't let them dam paradise!

• HB 1101 limits condemnation powers in acquiring reservoir sites to reservoirs used for agriculture, municipal water supplies and hydroelectric power. (signed by governor)

A further comment on condemnation is appropriate. Montana had broad eminent domain statutes allowing private parties to condemn for reservoirs on private land. Under present law, no company can build a plant or use water in any coal-related industrial development unless the state has granted it a permit under the Utility Plant Siting Act. Such filings are speculative, because the state has neither studied nor accepted a specific proposal for an energy conversion plant.

• SB 728, proposed and strongly supported by Gov. Tom Judge, represents one of the most critical pieces of environmental legislation. It postpones action on major water use permits from the Yellowstone River Basin for a three-year period. The moratorium, which curtails *granting* water diversion permits not *applying* for them, lasts until the year before lifting of a federal moratorium that halted federal planning for any interstate diversion of water until 1978. SB 728 allows a "breathing spell" to determine existing water rights in accordance with the Montana Water Use Act. It also permits the Dept. of Natural Resources and Conservation to assist other agencies and political subdivisions—such as irrigation districts, counties and towns—in reserving water for future agricultural, municipal, recreational and wildlife uses. For example, the Montana Fish and Game Commission has applied for minimum flows in the Yellowstone River to provide recreation and to protect the fish and waterfowl habitat on the lower Yellowstone. The department has asked for a reservation of water sufficient to sustain the aquatic communities of the river and to establish a base flow below which *new* permit applicants cannot deplete the river. Such reservations, if established, would hopefully take preference over industrial applications now temporarily suspended by the bill.

• HB 748 appropriates supplemental funds, requested by the Dept. of Natural Resources and Conservation, to hire enough help to record all existing water rights on the Yellowstone and its tributaries. Such a "crash" program would inform the state if granting requests for water, especially for coal development, might short agriculture, municipalities and recreation. (signed by governor)

INFORMATION GAPS

A study of the eastern Montana coal-water situation and existing Yellowstone Basin literature reveals a number of serious information gaps which prevent intelligent decision making. Little is known about the consequences which various methods, periods and levels of withdrawals may have on irrigation, agriculture, municipal water supplies, water-based recreation, fisheries and other aquatic life. Although several studies are analyzing consequences of water storage and diversion, the most significant proposal is one prepared by the Montana Energy Advisory Council (MEAC). The proposal outlines a series of projects to evaluate the potential physical, biological and water use impacts on withdrawals and development on the middle and lower portions of the Yellowstone River drainage. Although the MEAC study is too detailed to review here, a brief resume will emphasize its merits.

The three-year study is divided into three phases. Phase I, information gathering, permits baseline data to be collected in areas of principle concern such as aquatic communities, irrigation-dependent agriculture, municipal water needs, water quality, water-based recreation and hydrology.

Phase II, river basin model calibration and simulation and impact evaluation, uses the baseline information gathered in Phase I to predict the water requirement conflicts that may arise under various water flow and water development conditions. The simulated conditions aren't the total picture, but as pointed out by MEAC, they will be "useful in mediating the conflicting demands through a series of priority levels based upon legal rights and community desires."

Phase III, economic evaluation, joins the results of Phases I and II and presents various consequences in economic terms. It provides sufficient data by which decision makers can deal with water use conflicts and trade-offs associated with water uses, users and natural systems. Segments of this proposal are under way, funded by the Montana Department of Fish and Game, BuRec and some industrial applicants.

GETTING THE MESSAGE

There are those who feel that the Roche Jaune faces a bleak future. I'm not so sure. Letters are coming in from concerned citizens—from all over the country—who have heard about our own form of crisis.

They write to the Dept. of Fish and Game from crowded cities, places with spoiled streams, junk heaps, asphalt asylums and other degraded areas. They want to preserve scenic areas such as Paradise Valley. To them, a unique fish, such as a paddlefish, is a national treasure. And, an unpolluted, crystal clear blue ribbon river is a legacy.

That kind of feeling is a signal traveling through the land. Legislators in Montana are like those elsewhere. They have receiving antennae. It is hoped they will continue to get the message from Montanans and the rest of America.

Perhaps W.H. Hornby, executive editor and vice president of the Denver Post, in a speech entitled "A Concerto for the Yellowstone" given to the Miles City Chamber of Commerce in January 1973, best summarizes the feeling. "The energy companies should realize that to rush Yellowstone Basin coal conversion development on the pretext of crisis, beyond the point where they reasonably share our water and land with other needs, is to invite in the long haul massively increased public regulations of their activities. And it could bring the end of their enterprise freedoms as they enjoy them."

Overleaf: The cutthroat trout, which inhabits the Yellowstone drainage, is a sure sign of quality surroundings. photo by Jerry Manley

Protecting the Upper Yellowstone

Your excellent article, "Saving North Dakota," in the May/June 1974 *Montana Outdoors* was very interesting and particularly timely to the people of the Big Timber, Livingston and Gardiner area.

Quoting from the article, "Let's hope we have a Committee to Save Montana when the Bureau of Reclamation starts pushing for Allen Spur Dam on the Yellowstone River."

To update a bit, the Bureau of Reclamation has already started the push to build Allen Spur Dam. It began when the BuRec attempted to dewater the lower Yellowstone by leasing and optioning the flow of the main stream and its tributaries to the energy companies. At the same time, BuRec employes have been telling groups of eastern Montana ranchers that the only way to insure their supply of irrigation water is to support the building of large upstream impoundments.

The BuRec calls this "creating demand for the project." This follows a very successful strategy, long used, of contriving a need and solving it by construction of a dam, in this case Allen Spur.

A committee *was* formed five months ago dedicated to preventing the building of this dam and to preserving the free-flowing Yellowstone River.

We have called our group the "Allen Spur Committee to Save the Upper Yellowstone Valley." Membership is at present mostly local but as our purpose becomes widely known, we are attracting support throughout the state and from other states whose residents have visited our area.

Presently we are financing research into previous campaigns to get the dam authorized, and to obtain documentation of the status of the current putsch.

Our membership is well aware of the BuRec plan to use the excuse of coal development to gain support for the Allen Spur project but we feel that there are acceptable alternatives to their plan to drown the Upper Yellowstone Valley.

We will use all the help we can get. If any of your subscribers can send us background material, advise or support us by becoming members and joining in the financial labors, we will welcome them. Our address is: The Allen Spur Committee, Box 1285; Livingston, MT 59047.

"The time to start fighting is yesterday."—*Paul Working, president; Allen Spur Committee to Save the Upper Yellowstone; Livingston, Mont.*

THEY'RE DESTROYING WHAT THEY'RE TRYING TO SELL

I just read, "The Subdividers are Here," in the Jan./Feb. 1974 *Montana Outdoors*.

I am sure—after seeing my letterhead and the reference to the article—you are cringing. Don't. I think the article is superb, completely true, accurate, long overdue and, if anything, *not strong enough*.

The real estate profession (salesmen, brokers, developers and speculators) has raped and destroyed Montana for years with total disregard for the land, water, wildlife habitat, the citizenry and the ultimate buyers. The only benefit from this has been totally excess profits ranging from 250 to 2,000 per cent—and this only benefits a few developers. We are letting them sell our recreation and living experiences down the river. They are quickly destroying the very thing they are trying to sell.

My feelings are that the department should be congratulated for a great service to Montana and to those who love her as she is—beautiful. I hope the Department of Fish and Game supports the editor completely against the assault which will undoubtedly come from my colleagues.—*Paul B. Brunner, Eco Realty; Missoula, Mont.*

ROCKING THE BOAT

After reading "The Subdividers are Here," please accept my compliments and thanks for featuring such an article. It was well-written and quite accurately described the situation as my friends and I see it as residents of the Flathead Valley.

I know that your department is rocking a few boats by doing such an article and by becoming more involved in the field of land manipulation through subdivision. But I do believe that such issues are entirely relevant to the objectives of the department.—*Richard Trembath; Bigfork, Mont.*

DEPARTMENT DID ITS DUTY

I was highly pleased and impressed with the great article, "The Subdividers are Here," in the Jan./Feb. 1974 magazine.

If anybody in Montana should be telling the state what is happening to our wildlife habitat, it should be the Dept. of Fish and Game.

While it is true that Montana has a lot of territory, it cannot afford to lose the winter range, bottomlands and water courses which subdivision is destroying at an unprecedented rate.

More power to Bill Schneider, *Montana Outdoors* and the department for this great service to Montana!—*George Hummel; Missoula, Mont.*

AMERICA'S RENEWABLE RESOURCE

I would like to comment on the article, "This Year, Try a Natural Christmas" (Nov./Dec. 1973 *Montana Outdoors*), in which the author strongly suggests using a live Christmas tree, mentioning the White House and stating, "For the first time, trees will not be cut down and shipped to Washington for Yuletide festivities."

Several cut trees are still used in the various rooms in the White House at Christmas. Also, the tree planted on the White House lawn has a quite expensive, specially constructed drainage and watering system to give it a better than average chance for survival.

Trees planted in winter have a poor chance of surviving. Has the author considered what a yard would look like after several years of live Christmas trees had grown to maturity ideally spaced 12 to 16 feet apart?

It is suggested that an artificial tree might be considered. This is for a "Natural Christmas"? Plastic trees are a petrochemical product which is nonrenewable and nonbiodegradable. Trees are America's renewable resource.

Ecologically, 450,000 acres, most of which is unsuitable for other agriculture, are now planted to Christmas trees. This provides cover for wildlife and also one acre of Christmas trees produces enough oxygen for eighteen people, but as the trees grow to maturity the amount of oxygen produced decreases.

Trees are replanted on a two- or three-to-one basis, and this spring 85 million trees will be planted to replace the 35 million cut last fall. The Christmas tree industry generates revenue of $70 million

continued

on the wholesale level and $210 million on the retail level. Approximately 100,000 part-time jobs and 7,500 year-round jobs are involved. A large portion of this is in Montana.

Trees harvested from wild stands are usually cut to accomplish a thinning program for the production of saw log timber, so it actually has a twofold benefit.—*Peter Klinke, Montana director, National Christmas Tree Assn., Inc.; Eureka, Mont.*

WE SHOULDN'T HUNT THE HEN PHEASANT

I would like to take issue with some of the conclusions in John Weigand's article, "Should We Hunt the Hen Pheasant"? in the Sept./Oct. 1973 *Montana Outdoors*.

Weigand admits that Montana pheasant numbers have declined, but he doesn't say how much. Actually, since we have had the full-length statewide hen seasons (beginning in 1963), our kill has declined more than 60 per cent. In contrast, Wyoming and Washington have maintained their crops within 11 per cent of the long-time average, while Idaho's last two seasons have been the best in history.

It appears to me that a hen season experiment such as that conducted in Montana's Fairfield Bench would be of little value if the proportion of hens killed was unknown, as the author states. What kind of experiment is this?

In regard to hunting pressure, Weigand states that it is highly improbable that Montana hunters are plentiful enough to decimate hens. I can remember when 18,000 hunters would leave Billings on opening day, when most of Great Falls hunted Fairfield Bench and half of Butte and most of Missoula hunted the Flathead Valley. That was when the hunters could expect to bag some pheasants. Even now, with the birds so badly reduced 40,000 bird licenses were sold last year.

The "long-term investigations" that show no loss from hen hunting were conducted from Hysham to Glendive. Much of that sparsely populated Tongue River, Pumpkin Creek and Powder River contry has no more than one party of hunters a week! If these investigations had been conducted from Billings to Hysham, or any other heavily hunted valley, the outcome would have been very different.

In his references to Wisconsin, California, Utah, etc., Weigand fails to mention that in *all* other states, hen kills are limited as to area, season length and total kill. Only in Montana do we take hens statewide for the full season with no evaluation of the number killed or of the brood stock remaining. His theory that a certain proportion of hens is always "surplus" baffles me. Does this percentage still apply as the flocks dwindle year after year until none are left?

We should stop the killing of hens and give our few remaining birds a chance to increase. With numbers so critically low in our major valleys, even a planting and predator control program may be necessary.—*Ralph Brownell; Billings, Mont.*

• *The author maintains that the article contained factual information and fairly represented the reasons for Montana's declining pheasant populations.*—Ed.

BLACKTAIL PRAIRIE DOGS SYMBOLIZE OLD WEST

I enjoyed the brief article on endangered wildlife in the Catchall (March/April 1974). The blacktail prairie dog is an animal which has become endangered by environmental alteration. It is by no means an endangered species in the northern part of McCone County—yet. But I know of several towns comprising one-half to a whole section of land.

The ranchers would like to have a few of these critters left on their land as a symbol of the old West, but with the increased price of beef, they are becoming more concerned with more production from their land. Supporting a few thousand dogs and having the land reamed with a hole every 10 yards is not conducive to efficient land use for cattle production. One rancher told me that he should be paid for supporting prairie dogs since they occupy over one-half a section of his land.

Since there are not enough varmint shooters in this area of Montana, many of the towns have no population control which forces the ranchers to take drastic steps to control the population. Their method, poisoning, may lead to total annihilation of the town. Unless some means can be established to control the population to the ranchers' satisfaction, these entertaining animals soon may be seen only in zoos or reserves.—*Tomas F. Anderson; Wolf Point, Mont.*

PUBLIC NEEDS FACTS

The National Field Archery Association (NFAA) has assumed an offensive role in an attempt to educate the 65 per cent of our population not involved or committed to the issues surrounding the "hunter versus anti-hunter phenomenon."

Our program is bilateral. Some materials are aimed at our own ranks to obtain a better quality bowhunter and other materials are designed for the non-hunter. Factual data must be available to the public, both to put the needs of wildlife into proper perspective and to define the hunter's role in the biotic scheme.

Public information statements are available in bulk quantities (at printing cost) to state and national organizations such as sportsmen's clubs, outdoor and recreational shows, National Hunting and Fishing Day programs, Boy Scouts of America, etc. (Free samples are available from: National Field Archery Association, Route 2, Box 514; Redlands, Calif. 92373.)

The Bowhunting and Conservation Committee of the NFAA developed a textbook and instructor's manual to be used by state archery organizations for bowhunter education courses and *proficiency* testing. The course is designed for administration by state affiliated clubs with sanction by the individual departments of natural resources. We feel that "hunter safety" courses need updating to "hunter education and proficiency" courses. This applies to firearms as well as bowhunting. We have a master slide series for use with the textbook or as a self-contained program.

The need of a better hunter image and better public understanding and acceptance of hunting is primary to our country's sportsmen. Part-time workers and small budgets make the task more difficult.—*Dr. James J. Shubert, public relations; Bowhunting and Conservation Committee, National Field Archery Association*

NONGAME MANAGEMENT DESERVES FUNDS, TOO

I read your stimulating article, "Singing a Song for Unsung Wildlife," in the March/April 1974 issue. I couldn't agree with you more. As a student of wildlife management at the University of Washington, I am aware of the lack of user-public input into many state game department management directives. Budgets are allocated and policies formulated for promotion of game animals because hunters provide the bulk of operating funds through licenses, fees and munitions taxes. If state game departments were publicly funded, in whole or part, and organized as a wildlife department, the public would have a legal means of management input.

I was involved in the controversy over use of the Washington "vanity plate" license revenue. It became obvious that many state agencies requesting the projected returns were unsympathetic toward the lack of money for nongame management in the Washington Department of Game. Yet, nonconsumptive uses

of wildlife are even more popular than hunting (which also includes aspects of nonconsumptive uses).

It seems obvious that state wildlife departments should be managed just like other public agencies. A budget should be set aside for wildlife management, with hunting revenue used specifically for management and control of game animals and hunters. In this way, wildlife users participate and no one group dominates management decisions.

I believe the public is being short-changed in many management decisions affecting use of publicly owned natural resources. This seems to be due to lack of information rather than lack of interest. The oil crisis has created many conservation-minded people out of a naive and apathetic public—as shown by the increase in conservation magazine subscriptions and conservation organization memberships. The Watergate scandal has opened the public's eyes to the need for overseeing government functions.

Thus, your editorial comment on the Environmental Information Center and Northern Plains Resource Council points to ways in which public input can indeed affect the quality of the environment. Wildlife—as a quality of life indicator and a part of the natural environment—deserves these same considerations.—*Ronald H. Kurtz; Seattle, Wash.*

ENERGY PROBLEMS APPROACHED BACKWARDS

The reality of energy crisis in this country suggests matters of concern to environmentalists. In principle, "Operation Independence" is noble. However, I'd like to know why we continue to approach energy and other natural resource problems backwards?

Throughout my life, I have heard forecasts of tremendous energy demands of future generations. Environmentalists who preached a leveling off of growth, conservation of nonrenewable resources and research into alternate energy sources, have for years been scorned as crackpots. Well, now the crunch is upon us. Why do we still treat the symptom rather than the illness? Unless our growth levels off, it is clear that "Operation Independence," as well as other conservation measures, is doomed to ultimate failure. Present energy demands offer a more reasonable target for our technology than do impending future demands. I suggest the time has come for government to interpret to the public the fact that growth and extravagance are not essential to, but rather mutually exclusive with, our continued existence.

For the time being, energy conservation and a search for new energy sources are both essential. However, we must not undo our recent ecological gains in the name of energy crisis. Prior to rushing additional nuclear power plants into service, let's be absolutely certain we have sufficient knowledge to handle all of the resulting wastes. Before expanding drilling and mining operations, let's conquer the adverse side effects. There is no excuse, in a nation that put men on the moon, for oil spills, destructive mining practices or stream pollution. I do not believe that survival of this immediate crisis is worth the devastation of America! —*Steven C. Amstrup; Council, Idaho*

READER SINGS PRAISES FOR NONGAME WILDLIFE

I have read many excellent articles in your magazine, but "Singing a Song for Unsung Wildlife" tops them all. The value of wildlife for purposes other than hunting is infinite and cannot and should not even be compared. I hunt, but the joy and satisfaction I get is nothing compared with seeing all types of wildlife and noting their presence. I was really pleased to see the magpie and jackrabbit on the "unsung" list. The word "varmint" is on my black list.

I'm sure that all of us who appreciate our wild friends with whom we share this complex and delicately balanced sphere of life will agree with your subtitle, "we thought it was time we said something for nongame wildlife." I think we should have equal compassion for all wildlife. Setting a monetary value on the life of a wild, living thing has proved to be a serious human frailty for many years. Humans tend to judge the so-called "value" of other living things only according to how they are of value to humans, many times in some selfish or proud way, not considering each animal's right to life. Risking some toe treading, I think trophy hunting falls right in the middle of this category.

Thanks for the spark of enlightenment. We enjoy your magazine very much.—*Sam Samson; Boulder, Mont.*

MONTANA—BIG SKY OR BLACK SKY?

For the past six summers, I have crossed the prairies of eastern Montana, en route to my vacation paradise in Bozeman.

Anyone who sees nothing but barren land in this vast section of the Big Sky is blind to the beauties and resources of the plains. From Wibaux to Billings, I never cease to be amazed at the great expanse of the high plains. That feeling of bigness is incomparable!

Now strip mining threatens my view—and the lives of an abundance of wild creatures. Let the devastated slopes of the Appalachians bear mute testimony to the strippers' savage slash. Montanans must not allow their Big Sky to become the Black Sky on the prairies.

Only the most critical "watch-dog" efforts will keep the coal companies honest. The public must demand that reclamation laws be followed to the letter.

It is somewhat encouraging to know, however, that the people of Montana have a sincere spokesman in *Montana Outdoors*. I'm sure your magazine's efforts will go far in keeping all of us alert to the movements of the unscrupulous coal companies.—*Phil Buteyn; Beaver Dam, Wis.*

NONE BETTER

I enjoy the many good articles you publish in *Montana Outdoors*. I am against outside interests exploiting Montana for their own greedy good and then leaving us with the air pollution that is sure to be.

The beautiful Yellowstone River has been there for eons of time and it is now to be dried up for the almighty dollar. If we allow this to happen, we are the most stupid nation in the world. I am not an environmentalist, but I do believe in preserving our wonderful state for the benefit of mankind. I have roamed and hunted these many beautiful hills and mountains in Montana—there are none better.—*Joe Nutter; Parkersburg, W. Virginia*

INFORMATION APPRECIATED

We at Yellowstone Boys Ranch would like to thank you for your interest in our programs. In our opinion, *Montana Outdoors* is superb. That balance between quality environment, recreational opportunities and the needs and desires of people is a most difficult goal to attain. However, your magazine has accomplished this goal to a highly commendable degree.

The Montana Dept. of Fish and Game has supplied us with information—films, brochures and personal correspondence. The information has been utilized throughout our entire program, from Wilderness Club and hunter safety groups to the school system and lodge families.

Thank you once again for your support and concern.—*Greg Cross, Yellowstone Boys Ranch; Billings, Mont.*

AN ALL-PURPOSE TOURING VEHICLE

Thank you for printing an article which highlights one practical use for bicycling which many Montanans could enjoy (*Montana Outdoors*, March/April 1974). Also very useful, I thought, were the inset articles which summarized very completely the types of bicycles and equipment necessary to tour.

Americans should begin to think of the bicycle as more of an all-purpose touring vehicle rather than a specialty vehicle, the riding of which is considered an entire sport in itself.—*Kevin McKelvey; Missoula, Mont.*

POLICY ON LETTERS

Letters published in the "dear F&G" section of *Montana Outdoors* do not necessarily reflect the opinions and philosophies of the Montana Department of Fish and Game. They represent the author's feelings. We reserve the right to edit letters for length.

WATCHERS IN THE WILD by Daniel Cohen; Little, Brown and Co., Boston; 1971, 178 pages, $5.95.

Ethology for the wildlife enthusiast is what space travel is for the physicist and astronomer. It adds a new, exciting and fascinating dimension to the field. Ethology is a 20th century science and, put simply, it is the study of the behavior of animals in their natural environment. It combines the primitive survival skill of close animal observation with the sophisticated objective and deductive reasoning of modern detective work.

Daniel Cohen has written an easy to read, popular introduction to this novel science by summarizing activities of a few of ethology's leaders.

If you are under 16, and interested in wildlife, read it—you'll like it. You'll learn how herring gulls avoid injuring conflict, how European crows discourage predation, why unmated greylag geese become accident prone and why gazelles seek out baboons for traveling companions. You'll also learn to appreciate the significance of a baboon's yawn, a gorilla's chest beating and a chimpanzee's use of primitive tools.

If you are over 16, hunt up Konrad Lorenz's "King Solomon's Ring," Niko Tinbergen's "Curious Naturalists," George Schaller's "The Mountain Gorilla," or Jane Goodall Lawick's "My Friends the Wild Chimpanzees." Stories from these four works make up the bulk of Cohen's book but these originals are "closer to the field" and more detailed. They are just as well written and easy to read and you get the word straight from the researcher's pen.—*Mike Aderhold*

POWER OVER PEOPLE by Louise B. Young, Oxford University Press, New York; 1973, 216 pages, $7.95.

Like it or not, Montanans will soon confront the impact of energy transmission on land, air, water, wildlife and people. Already, several extra high voltage (EHV) overhead lines are proposed—and opposed—in Montana. Some lines may pass through fragile wilderness, wildlife and recreation areas. Some may cross fertile farmland and hay meadows. Others may threaten children and livestock. And still others may have a dramatic effect on game and nongame wildlife.

Thus, all Montanans should find and read Louise Young's "Power Over People."

Anyone researching the subject of electric transmission finds little literature that isn't provided by the energy industry. In her book, Mrs. Young reveals why much of this industry-based information is of limited use to a citizen or landowner sincerely searching for the true impact of a proposed line.

She wraps her story around the attempt of a few Ohio people to make a 765 kilovolt (kv) line planned by the Ohio Power Co. less damaging. She emotionally tells how their struggle evolves into an exercise in futility. And then, she factually explains why. "Using the power of monopoly, the power of eminent domain, and the power of their vast financial empire, they [the power companies] are able to overcome almost all protest," she writes. "And where they encounter unusual resistance they mount a scare campaign of desperate haste."

The setting is Laurel, a small Ohio village with a population of 104. Here, "Clovis Strasbow," "Aunt Kiz" and others struggled fruitlessly with the energy industry. Although some success was realized, they only fell further and further behind.

Intermingled with the personal experiences of this small band of protesters are sections on the actual impact of transmission lines, alternative energy options and the government's role in energy policy. The author's homework is sound, complete, far-reaching and, to the layman, sometimes shocking. She describes how such lines:

- mar the landscape like an aesthetic disaster. (One utility official explains, "You'll get used to them.")
- produce corona discharge which, in turn can produce ozone, "one of the most toxic elements in our atmosphere," and other air pollutants.
- scramble TV and radio reception.
- cause noise pollution with their constant hum and crackling.
- sometimes require use of destructive herbicides to maintain the right-of-way.

The book also explored the feelings of some of the people who already live under EHV lines, such as the story's central figure.

One landowner described how he had a hard time getting his cattle to pass under a line because the hair stood straight up on their backs and how he received a shock when he stepped down from his tractor.

Another warned that children must not fly kites or model airplanes under the lines; sometimes they even received shocks when running barefoot on the grass.

One man couldn't paint his aluminum siding because he received shocks through the brushes. Another couldn't paint his barn roof for the same reason, so he complained to the power company. The utility, in turn, suggested that he ground himself by running a chain down his pants and allowing it to trail behind him on the roof.

Some housewives were afraid to turn on the water or sit on toilets because of the shocks. A farmer complained that horses running under the line had all the hair and whiskers burnt off their noses, and some men reported the hair was burnt off their arms.

Beside all this, "Power Over People" refers to research studies that show EHV lines pose a grave threat to human health.

People like Mrs. Young are often labeled "anti-progress" by industry. But she defines this "progress" as "progressively narrowing the number of options open to Americans."

Regardless of views on progress and growth, Montanans—especially landowners—have an obvious interest in transmission. So this book simply must be part of the library of anyone protesting a power line. It does a superb job of warning protesters of the obstacles they face. For example, the author asks one power company spokesman what he thought about this opposition, and he replied, "There are always a few crackpots who feel sentimental about dear old grandfather's place."—*Bill Schneider*

wildlife shorts

Contrary to common belief, the wolf is gaining a reputation as a gentle, loving and sensitive animal. The new thinking was recently confirmed by John Fentress, a University of Oregon researcher. Fentress found wolves friendly and more sensitive than dogs.

In one Montana Department of Fish and Game study area, hunters harvested less than five per cent of the sage grouse population. In the same area, sage grouse ate only sagebrush during December, January and February; no other food was consumed. Researchers also observed 41 nests in the study area. Every one was under sagebrush.

Birds have the highest body temperatures of all creatures—104-110° F.

Drakes of most duck species lose their colorful attire after mating and for about a month resemble adult females.

what makes a stream good fishing?

by Norm Peterson

illustrations by Vern Craig

HAVE YOU WONDERED what made your favorite trout fishing spot better than one which *looked* just as good? Or, why does one stretch of a stream have more and larger trout than another?

The answers are hard to find. For instance, one stream which apparently has excellent water quality, sufficient quantity and many deep pools with adjacent riffles would appear to offer good fishing. But, it may produce neither the numbers nor size of trout that a similar looking stream does because of differences in *productivity* ("richness" or rates at which energy is stored and transferred).

Similarly, a stream or stretch of stream with high productivity potential may be limited before reaching its potential by factors such as chemical pollution, alteration of physical environment, etc. *Limiting factors* determine the size and quality of a fish population. They may be as evident as the physical characteristics of a stream or as subtle as a few degrees increase in the average annual temperature.

To determine what factors limit a trout population, one must understand the basic habitat requirements of trout.

A quality trout population requires quality

continued

Clean and stable riffle areas are prime trout food production sites.

habitat. And this habitat, in turn, has three requirements: (1) optimum water quality, (2) sufficient water quantity and (3) a natural physical channel providing adequate sites for spawning, food production, resting and high security.

WATER QUALITY

"Optimum water quality" for trout is water which contains sufficient nutrients for good productivity, is of an agreeable temperature and contains enough dissolved oxygen for food and fish growth. Such water should lack factors which "mask" or decrease the productive potential (for example, large amounts of a pollutant, such as silt or a heavy metal). Water quality is, in essence, related to chemical (dissolved solids, oxygen, etc.) and physical (temperature, silt, etc.) components of the water.

Water quality can change quickly, and often with devastating effects on trout. Adding a pollutant which kills a large section of the fish population within hours or days would be an obvious change in water quality. When this happens, the public often becomes irate enough to demand retribution. But, what about the more subtle changes in water quality?

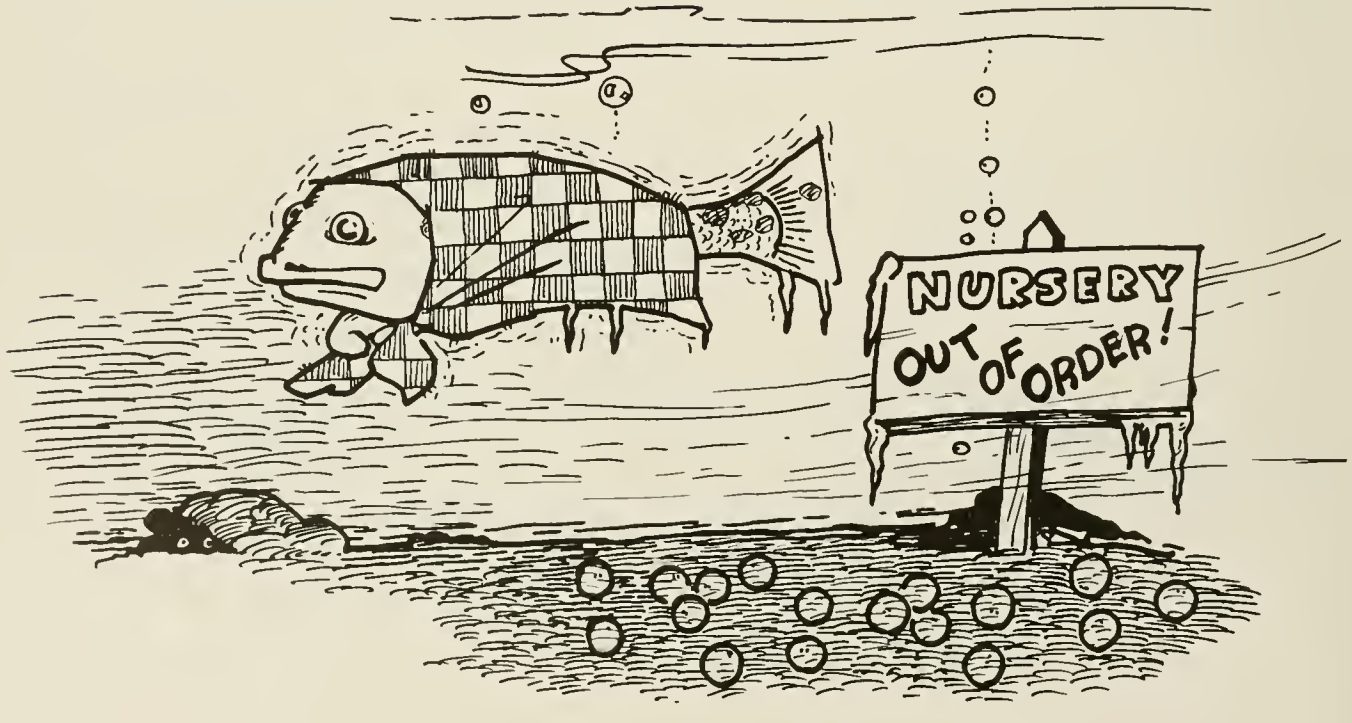
Evidence of subtle pollution, such as an increase in average water temperature of perhaps three or four degrees, is often hard to detect without scientific investigation. For instance, in smaller streams summer temperatures depend largely on streamside vegetation. Removal of this vegetation often results in increased summer water temperatures. The effect on fish includes an increase in metabolic rate which, in turn, increases the need for oxygen and food. Increased aggressive activity—such as "nipping"—toward their own and other species sometimes accompanies increased temperatures.

Loss of streamside vegetation, which provides insulation, causes lower minimum water temperatures in winter. Lower temperatures may extend the incubation period of trout eggs into the spring flood period and therefore increase loss of eggs and young fry in the "nurseries" (e.g., on stream bottoms, between pieces of gravel). Removal of vegetation not only raises summer and lowers winter temperatures, but also results in increased bank erosion and sedimentation—thus, more harm to trout populations.

Subtle changes in water quality can result in the annual death of thousands of fish in a single stream. Yet, few people know it.

WATER QUANTITY

It seems almost ridiculous to say that fish need water to live. It seems ridiculous, until one realizes that many Montana streams are annually "dried up" for one reason or another. When total dewatering



Removal of streamside brush and other cover means less "insulation." Thus, water temperature can decrease and harm trout and trout eggs.

occurs, not only are all the fish lost but the food on which the fish feed disappears. If a stretch of river or stream is totally dewatered, it takes years for a viable trout population to return, even if—or when—sufficient amounts of water are again left in the stream for the entire year. Or, in short, a stream may "look good" but still lack fish because it was dewatered earlier.

NECESSARY STREAM CHARACTERISTICS

Physical characteristics of a stream play the final role in determining trout numbers, assuming water quality and quantity are adequate. The ratio of riffles to pools, depth and volume of water, current velocity, surface area and type and amount of cover are some of the physical characteristics which influence trout numbers.

Riffles are important areas where (1) trout food is produced and (2) trout lay their eggs, the eggs incubate and small fry stay until emerging to begin a competitive existence.

Pools and cover (logs, overhanging streamside brush, undercut streambanks, etc.) provide "homes"—resting sites or places of security for trout.

Relationships between trout populations and current velocities and depth are based on space and food and security levels, respectively.

To what degree do trout depend on each of these physical characteristics?

RESEARCH PROVIDES CONCLUSIONS

A study of Little Prickly Pear Creek[1] (a small trout stream near Helena) showed that current velocity and total cover were the most important factors for brown trout and current velocity was most important for rainbow. Research showed that deep, slow pools with extensive cover had the most stable populations; fast water pools and those with limited cover had less population stability and greatest population turnover due to movement in and out of the area and natural and angler mortality.

On a small Gallatin County trout stream, the population of fish six inches and larger decreased by about one-third when streamside brush cover was removed.[2]

On a section of Rock Creek near Red Lodge where cattle use was light, 76 per cent more streamside cover existed than in a nearby section where floodplain vegetation was greatly reduced by clearing and intensive overgrazing.[3] Brown trout were 27 per cent more abundant and weighed 44 per cent more per surface acre (a measurement used by biologists for comparison between fish populations) in the lightly grazed section than in the overgrazed section.

Another study related fish populations in Little

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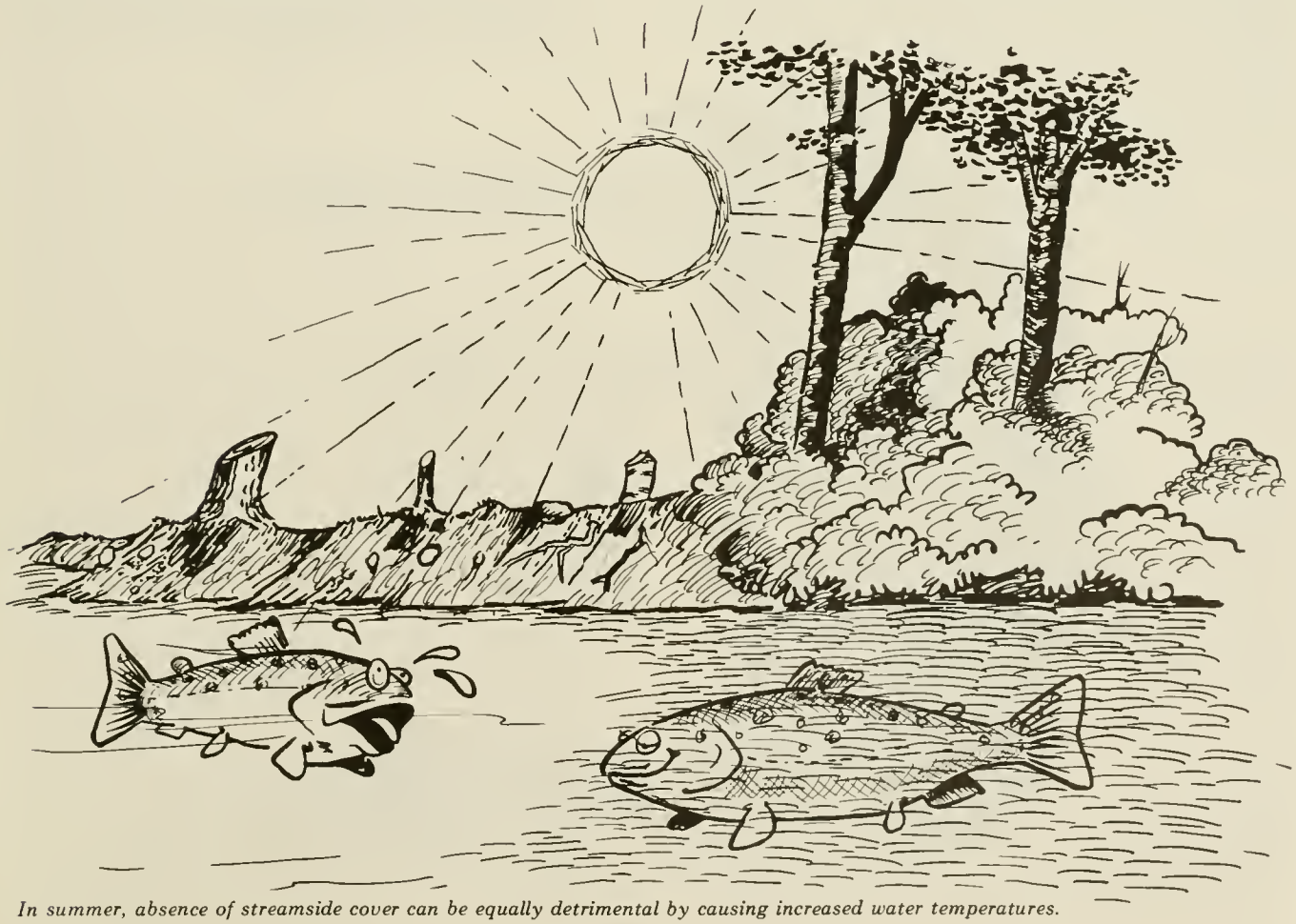

In summer, absence of streamside cover can be equally detrimental by causing increased water temperatures.

Prickly Pear Creek to channel alterations in various habitat zones.[4] Number and weight of brown and rainbow trout was about 78 per cent greater in unaltered sections than in altered sections of the stream's mountain zone. In the lower meadow zone of the same stream, brown and rainbow numbers were 14 and 55 per cent greater, respectively, in the unaltered section.

Research conducted on three sections of the Ruby River yielded similar conclusions.[5] One section was channelized with a bulldozer, the streambanks of the second were lined with blanket rock riprap and the third was unaltered and in a nearly natural state. Approximately three times as many brown trout (one year and older) were present in the unaltered section when compared to the bulldozed section. And, over two times as many browns (one year and older) were present in the unaltered section when compared to the section riprapped with blanket rock.

Conclusions of this research underline the fact that a livable habitat for trout is an extremely complex subject. Any small change in that habitat can totally destroy a quality fish population—and recreation fishing. Trout fare best when their habitat remains undisturbed by man.

The abundance of trout or other game fish populations is proportionate to abundance and diversity of habitat. And, of course, quality fishing is proportionate to fish populations in streams. Therefore, it follows that quality fishing hinges on quality habitat.

Changing limits or other regulatory management techniques do little to protect fishing once the habitat is destroyed. Once we resort to total management by regulations, we are then managing *fishing* and not fish populations.

We ask a lot of a trout—it must take the bait offered, fight hard (but never hard enough to get off the hook), be larger than expected when landed and have a delectable flavor when presented as the main course of a meal. Is it asking too much that we, in return, protect its home, food supply, nursery and the future existence of the species?

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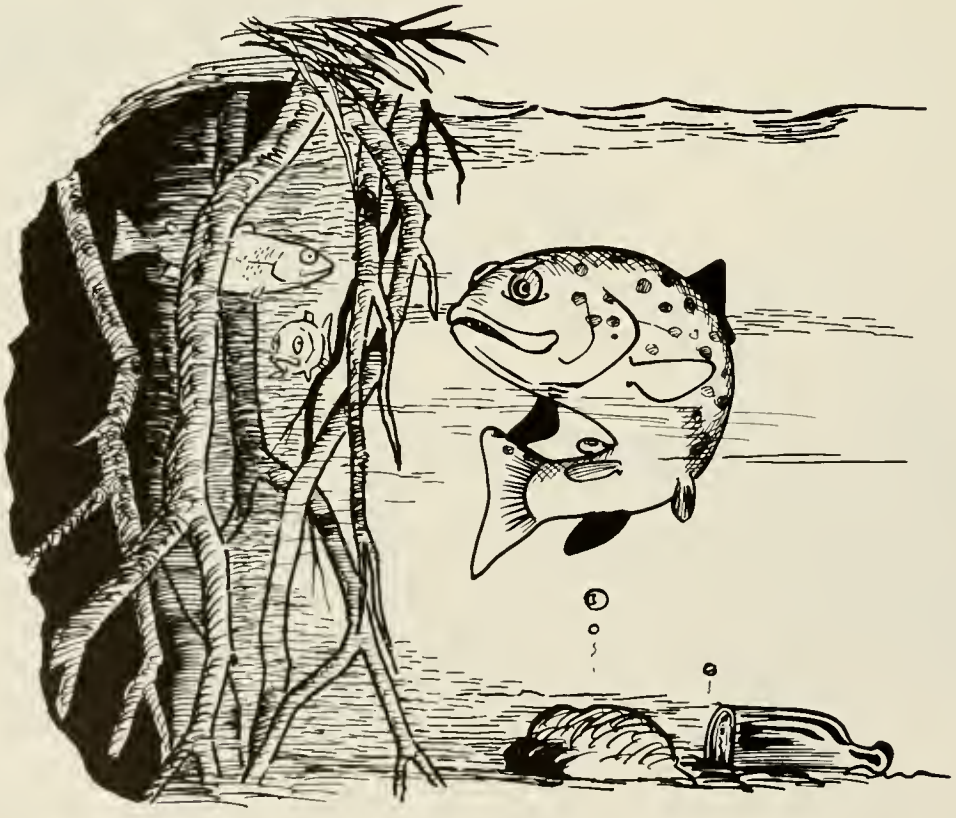

Undercut banks often provide safe "homes" and nesting sites for trout.

1974 Legislative Roundup

The following is a brief summary of legislation which was considered during the 1974 session pertinent to fish and wildlife. Many key environmental bills were approved by substantial margins in the House of Representatives, only to die in various Senate committees or on the Senate floor.

Space limits us to short, and often probably incomplete, descriptions of bills. Additional information is available from Legislative Council, State Capitol; Helena, MT 59601—Ed.

SENATE BILLS

SB 181 (Klindt, R-Billings)—killed in Senate State Administration Committee

This legislation would have removed the recreation and parks division from the Department of Fish and Game. It would have established a division of parks and physical education in the Department of Natural Resources and Conservation.

SB 188 (Darrow, R-Billings)—killed in Senate Natural Resources Committee

"The Pollution Disclosure Act of 1973." This act would have required industries to disclose their emissions, discharge or disposal of contaminants which could adversely affect the quality of water, air or the environment.

SB 401 (McGowan, D-Highwood)—killed in Senate Natural Resources Committee

The bill would have strengthened and extended present erosion and sediment control activities. Through the Department of Natural Resources and Conservation, it would have established a statewide control program to protect Montana's land, air, water and natural resources.

SB 405 (Broeder, R-Kalispell)—indefinitely postponed

"The Montana Forest Practices Act." This bill would have given the Board of Natural Resources and Conservation the authority to adopt rules establishing minimum standards for forest practices on state and private forest lands. It would have provided landowners with a set of standards for protection of their land and other resources of public value. Key amendments included consideration of scenic values, repeal of current slash disposal regulations and provisions placing the responsibility for payment of damages on the forest landowner if uncollectable from either the operator or timber owner.

SB 418 (Harrison, R-Helena)—killed on second reading in the House

"The Sun River Bill." This bill would have suspended the status of the Sun River Game Preserve for a three-year period. The Department of Fish and Game would have managed elk in and around the 200,000 acre preserve during this time. For deer, the department recommended a one-deer limit and a season running concurrently with the statewide general big game hunting season. For elk—to offset any "rush" by hunters to a "new" area, recommendations called for only an antlered bull season in 1974. The second year would have asked for general antlered bull hunting, and also an either sex season during the last two weeks of the general season. For the third year, recommendations would have been contingent on results of the first two seasons. It was amended to open the area to permit hunting.

SB 465 (Moore, R-Two Dot)—signed by governor

This act provides that the Department of Fish and Game and the Department of Law Enforcement and Public Safety incur costs of prosecution in cases of criminal proceedings by agents of the department and arrests by agents. Costs, including attorneys' fees, will be borne by the state agency causing the arrest.

SB 490 (Northey, R-Missoula)—signed by governor

This bill would allow nonresidents to possess raptors if the nonresident also possesses a falconry permit. Nonresidents, living temporarily in the state would be able to obtain a Montana falconry license and be allowed to hunt with falcons, subject to all Montana laws and regulations.

SB 494 (Klindt, R-Billings)—killed in Senate State Administration Committee

This bill would have established a division of parks and recreation within the Department of Social and Rehabilitation Services, removing that division from the Department of Fish and Game. (SB 181 was an attempt to locate the recreation and parks division in the Department of Natural Resources and Conservation.)

SB 498 (Klindt, R-Billings)—killed in Senate Highways and Transportation Committee

This legislation would have allowed establishment of footpaths and bicycle trails wherever highways, roads and streets are being constructed, reconstructed or located. The act would have been funded through the State Highway earmarked revenue fund.

SB 528 (Keenan, D-Anaconda)—indefinitely postponed

To provide that the Fish and Game Commission has the power of enforcement over all public fishing reservoirs and public lakes, rivers and streams.

SB 548 (Lynch, D-Butte)—signed by governor

This bill states that importing salmonid fish or eggs is unlawful unless they are certified free of infectious organisms. If the organisms are contaminated, both cargoes and vehicles may be quarantined.

SB 585 (McCallum, R-Niarada; Deschamps, R-Missoula; Rosell, R-Billings)—signed by governor

This act authorizes snare traps for the purpose of snaring animals or birds in accordance with fish and game regulations.

SB 612 (Northey, R-Missoula)—indefinitely postponed

This legislation was supported by the Montana Wildlife Federation and the Western Fish and Game Association. It would have limited nonresident hunting licenses to 14,000 and increased all present fees.

SB 728 (McGowan, D-Highwood; Mathers, R-Miles City, and others)—signed by governor

"The Water Moratorium." The intent of this legislation is to evaluate the problems related to the water resources available in the Yellowstone River Basin and the future development of the eastern part of the state. The bill bars state action on major requests for water for three years or until all existing water rights are determined. This will give state agencies time to compile and evaluate information necessary for long-range plans.

continued

HOUSE BILLS

HB 88 (Towe, D-Billings, and others)—killed in House Natural Resources Committee

"The Montana Environmental Protection Act." To protect the natural resources of the state and insure enforcement of regulations. This bill was a holdover from the 1973 session. It would have allowed any individual to bring suit against a defendant if it was felt that damage to the environment—pollution destruction, damage or impairment to the natural resources—was inevitable or had already occurred and caused injury.

HB 133 (Fagg, R-Billings, and others)—killed in House Natural Resources Committee

"Pastoral and Scenic Rivers Act." This is the rewritten, compromise bill, first introduced as HB 892. It is the revised version of the 1973 "Wild and Scenic Rivers Act." The word "wild" was deleted from the bill and replaced with "pastoral." The select committee which studied the bill during the interim defined "pastoral" as "devoted to or based upon the cultivation of sheep or cattle," and "of or related to the countryside as contrasted with the city." Therefore, a "pastoral" river would be one flowing through an agricultural area, providing water for irrigation and livestock, and then providing recreation opportunities and fish and wildlife habitat. No specific rivers were enumerated in the bill. Local conservation districts would have administered the bill.

HB 474 (Swanberg, D-Great Falls, and others)—killed in Senate Natural Resources Committee

"The Stream Alteration Act." To provide for the extension of the policy of preserving natural and existing shape, form and course of rivers and streams in Montana to activities of public persons or organizations, in addition to activities of public agencies. The bill was drafted to include private and agricultural interests in stream alteration regulations. No penalty provision exists in the present law; HB 474 would have imposed a misdemeanor charge if there was a failure to comply. After approval in the House (62-34), the bill came out of the Senate Natural Resources Committee with a "do not pass" recommendation and died on the Senate floor, 15-33.

HB 550 (Bardanouve, D-Harlem, and others)—killed in Senate Natural Resources Committee

To provide for the protection and enhancement of shoreland areas; to provide county zoning, with assistance by the Department of Natural Resources and Conservation; and zoning to be done by that department upon default by a county. This bill would have required that policies and plans be made and authorization given to counties to adopt shoreland zoning for efficient use, conservation, development and protection of the state's water resources. The intent was to insure safeguards against water pollution and to protect spawning grounds, fish and aquatic life, to control building sites and land uses and to reserve shore cover and natural beauty. Enforcement would have been given to the Department of Natural Resources and Conservation. The bill passed the House 64-31, but met opposition in the Senate Natural Resources Committee. On a motion to reconsider the committee report, the Senate voted it down, 20-27.

HB 568 (Huennekens, D-Billings, and others)—killed on second reading in the House

To provide that there shall be access to state lands and that state lands shall be open to the general public for recreation use, except in certain cases. Specifically, this bill would have provided that all state lands of 320 or more contiguous acres suitable for grazing or forestry would be open to recreational use by the public at all times. The areas could have been closed for reasons of public safety. Motor vehicles would have been restricted to roads or trails.

HB 622 (Burnett, R-Luther)—killed in House Taxation Committee

To provide that all fines and bonds collected under the provisions of the Fish and Game laws be deposited in the general fund of the county in which the offense was committed.

HB 623 (Galt, R-Martinsdale, and others)—killed on second reading in the House

To eliminate the Department of Fish and Game authority to acquire land by condemnation.

HB 627 (Kvaalen, R-Lambert, and others)—signed by governor

An act appropriating money to the Department of Fish and Game for construction of a multi-purpose structure and related recreational facilities on the South Sandstone Waterspreading and Recreation Project in Fallon County. Through an amendment, all funds will come from earmarked Fish and Game funds.

HB 628 (Bradley, D-Bozeman)—signed by governor

The bill calls for the Department of State Lands to identify existing or potentially natural areas on lands under its jurisdiction. These areas will be protected from condemnation or other development that adversely affects the integrity of the natural area until legislative action is taken specifically to authorize the condemnation or development.

HB 645 (Bell, R-Helena)—signed by governor

Prohibits the discharge of a firearm across a county highway. This bill amends the present statute governing the shooting of firearms from or across the roadway, state or federal highways to include county roads.

HB 651 (Halvorson, D-Kalispell)—killed on second reading in the House

To impose an additional tax on the capital gain realized in the speculative sale of land and prescribing penalties for the evasion of such tax. The tax would be computed as follows: On a graduated basis, the developer would pay a tax on the amount of gain made from the sale and the length of time the land was held before development.

HB 688 (Cox, R-Billings)—killed in committee

An act to provide free camping for senior citizens of Montana in the state parks. The person would have to present a valid pioneer license or a document establishing that he or she was a Montana resident and at least 62 years old.

HB 714 (Galt, R-Martinsdale)—killed on second reading in the House

An act requiring approval by the county planning board or county commissioners for land acquisition by the Fish and Game Commission.

HB 724 (R. Harper, D-Butte)—killed in committee

This bill, one of several license bills, would have limited nonresident big game licenses to no more than 8,000. If applications exceeded this number, the department was advised to conduct a drawing and select 8,000 applications at random. The bill would have increased the nonresident big game license cost from $151 to $251.

HB 728 (Watt, D-Missoula; Cox, R-Billings, and others)—killed in committee

An act to conserve wood for more necessary uses by ending its wasteful use as milk cartons. The bill would have required that all milk be sold in nonwood product containers which are reusable and/or recyclable.

HB 755 (Murphy, D-Stanford; Baucus, D-Missoula, and others)—vetoed by governor

An act directing the Department of State Lands to study saline-alkali damage and develop and execute programs to prevent or correct damage to Montana's natural resources of soil, water, wildlife and to human health and livestock. The bill created a Saline-Alkali Planning Council within the Department of State Lands.

HB 778 (Kimble, D-Missoula)—signed by governor

A bill amending the present law to require persons to wear 400 square inches of hunter orange material above the waist. The act further stipulates that the orange must be visible at all times.

HB 795 (Shelden, D-Libby; Turman, R-Missoula, and others)—killed in Senate Natural Resources Committee

This act would have authorized and enabled public bodies, private individuals and private organizations voluntarily to provide and preserve open space land anywhere in the state. These voluntary legal agreements—"conservation easements"—could have permanently guided use of land plots according to terms specified by the owner. The bill passed the House 75-3. It came out of the Senate Natural Resources Committee with a "do not pass" recommendation and the Senate accepted the committee report, 35-9.

HB 824 (Brand, D-Deer Lodge; Lynch, D-Butte, and others)—killed in committee

To create the Three Forks Game Preserve. This bill requested the legislature to designate a game preserve from Sappington, Mont., north to Trident. It would have included land at the headwaters of the Missouri River. The designated area was to be closed to all hunting.

HB 844 (Bradley, D-Bozeman; Hager, R-Billings, and others)—killed in House Education Committee

The intent of this bill was to develop a statewide environmental education program.

HB 845 (Quilici, D-Butte; Menahan, D-Anaconda; Flynn, D-Dillon)—signed by governor

This bill deletes the requirement that a taxidermist record license number of a hunter when a specimen of game is mounted.

HB 854 (Johnston, D-Cut Bank; Stephens, D-Dutton, and others)—killed in House Fish and Game Committee

This bill would have required all persons carrying big game rifles in the field during any deer or elk season to have a valid hunting license. Landowners were exempt while on property which they owned or controlled by lease or agreement.

HB 875 (Huennekens, D-Billings)—killed in Senate Judiciary Committee

"The Planning and Rural Subdivision Act." To declare the legislature's concern about uncontrolled subdivision development in Montana and about the adverse effects of such development on the health, safety and welfare of Montanans. To provide for a temporary suspension of rural subdivision development—with exemptions—until July 1, 1976. To provide for compilation of a statewide land and water resources inventory identifying environmentally critical areas. The bill was amended in committee to exclude certain agricultural land transfers. The bill passed the House 75-19, but it met strong opposition when it was referred to the Senate Judiciary Committee. The bill failed to pass out of committee. On a motion to reconsider on the Senate floor, the bill failed, 15-32.

HB 882 (Shelden, D-Libby, and others)—killed on third reading in the House

This act would have required imposition of a fee when a corporation, business entity, etc. applied for a lease, permit, license or certificate from any state agency and an environmental impact statement was required. The bill would have removed the financial burden of gathering data from the state agencies and placed it on the applicant.

HB 949 (Roberts, D-Libby; Driscoll, D-Hamilton, and others)—signed by governor

This bill designated the Department of Fish and Game as the state agency authorized to represent the public in stream adjudications under the Montana Water Use Act.

HB 951 (Roberts, D-Libby; Johnston, D-Cut Bank, and Stephens, D-Dutton)—signed by governor

This act removed the mountain lion, wolverine and cougar from the predatory animal and wild animal classification.

HB 969 (Fagg, R-Billings; H. Harper, R-Helena, and others)—indefinitely postponed after second reading in Senate

The intent of this bill was to establish an outdoor recreational system to preserve Montana's natural and historical heritage and to provide an adequate supply of scenic, accessible and usable lands and waters to accommodate the outdoor recreation needs of Montana citizens. This bill was rewritten numerous times, contained 24 pages of amendments and, after a series of confusing votes in the Senate, was indefinitely postponed.

HB 989 (Menahan, D-Anaconda; Kosena, D-Anaconda, and others)—signed by governor

This bill amends the noise limitation standards for snowmobiles as well as amending the enforcement and penalty provisions. It defines sound level and calls for the snowmobile industry to comply with the level limitations.

HB 1016 (Shelden, D-Libby)—left in House Conference Committee

This act would have amended present subdivision laws to define a subdivision as a division of land which creates one or more parcels containing less than 40 acres. The present law requires a subdivision to be 10 acres or less.

HB 1017 (Shelden, D-Libby; Huennekens, D-Billings, and others)—signed by governor

This bill slightly strengthens present subdivision laws and redefines "subdivisions" to include only parcels of land less than 20 acres in size.

HB 1033 (Towe, D-Billings; Lynch, D-Butte, and others)—killed in House Rules Committee

Any land less than 10 acres in size, whether contiguous or not, would have been classed as a subdivision. It would have been unlawful for a subdivider to sell subdivided land unless a public offering statement was furnished to the purchaser before a contract was signed.

HB 1037 (Seifert, R-Polson; Selstad, R-Great Falls)—left in House Natural Resources Committee

This bill would have relaxed present subdivision laws and allowed for exemptions for surveys and environmental assessments. It would have redefined "subdivision" to include five parcels of land rather than the present two parcels of ten acres or less.

HB 1043 (Huennekens, D-Billings; R. Harper, D-Butte)—killed on second reading in the House

This bill would have made it a misdemeanor for anyone to demand payment for hunting and fishing privileges on any block of land that included federal or state-owned land.

HB 1045 (Huennekens, D-Billings)—killed in Senate-House Joint Rules Committee

This bill would have raised the nonresident license fee from $150 to $200. Nonresident big game licenses would have been limited to no more than 10 per cent of the total number of elk tags sold to Montana residents in the preceding year. Nonresident deer licenses would be raised from $35 to $50 and the number sold couldn't exceed the number sold the preceding year to residents. Nonresident antelope licenses would have been raised from $35 to $50 and the number sold to nonresidents could not total more than 10 per cent of the total number of licenses issued the previous year.

Fishing the North Fork of the Flathead. Hopefully the Flathead River system will always provide quality outdoor recreation. F&G photo by Steve Bayless. Left, Flathead Lake. F&G photo by Bill Schneider

the waters of the flathead

by Otis Robbins, Jr.

"Man has empathy towards rivers because of all the inanimate elements of nature, they are the most personal. Rivers have a birth, a strengthening youth, a majestic maturity. They move. They speak. They have moods, laughing or angry, brooding or serene. Man, who yearns for immortality, observes the eternal life of rivers with admiring awe." —*John M. Kauffmann, National Park Service*

the waters of the flathead *continued*

GLACIERS GROUND AND carved out the valleys and mountains of northwestern Montana and then receded 8,000 years ago. This marked the catastrophic beginning of one of the nation's most pristine and beautiful watersheds—the Flathead Valley.

Then for thousands of years, only early Indian tribes inhabited the valley. Few major or rapid environmental changes occurred.

Early explorers, fur trappers, traders and pioneers discovered the basin in the 1800s. The first town established in the upper Flathead Valley was Demersville in 1887. Finally the Great Northern railroad came to the valley in 1892 and development speeded up.

From that point on, development escalated.

Some of man's activities were drastic and the effects immediate. But others went mostly unnoticed. Inch by inch, the Flathead has reached the point where additional deleterious effects could condemn one of America's most scenic river basins to growth-spawned destruction.

Still rich with clean air, wildlife and *water*, the Flathead has escaped man's heaviest hand. But if its residents continue to relentlessly demand "progress," Montana could lose the Flathead.

Once, rivers such as the Ohio, Mississippi, Cuyahoga, Hudson, Columbia and Susquehanna could boast of clean, unfettered waters. Today, these and many more resemble "canals" with locks, dams and some portions so polluted that aquatic life barely survives. Living waterways became near biological deserts.

Will the Flathead follow in the footsteps of her sister waterways? It could happen. If this valley is to retain the desirable qualities that attracted its residents, then its problems must be recognized and solutions explored.

ORIGIN OF THE FLATHEAD

The Continental Divide gives birth to many small streams that eventually become the Flathead River system. The Flathead is formed by three main tributaries—the North, Middle and South forks. The North Fork originates along the west slope of the Continental Divide in British Columbia; the Middle and South forks rise in northwestern Montana along the Continental Divide, south of Glacier National Park.

In 1966, the Montana Fish and Game Commission designated the Flathead River and its three tributaries as a State Recreational Waterway. Unexcelled scenic beauty, water quality, public use and access, wild trout fishing and outstanding hunting all qualify the Flathead for this designation. At this time, the Forest Service is studying the three forks of the Flathead for possible inclusion in the Wild and Scenic Rivers Act. Certainly, this would help to protect the Flathead.

One can't consider fishing in the three tributaries without also considering the system's lakes—including Flathead. What happens in one part of the river system affects the other parts. Everything is connected. Cutthroat and Dolly Varden populations depend not only on lakes, but also on the quality and quantity of spawning tributaries. For example, Hungry Horse Dam, completed in 1953, blocked spawing migration into the South Fork.

Many people believe that the present, quality aquatic environment should be maintained—a commendable goal, no doubt. However, vast improvement is a *must* where water quality has deteriorated. The upper Middle and South forks, at present, represent desirable water quality. Sections of Ashley Creek, Whitefish River and Stillwater River, for example, demand drastic revitalization.

TEMPERATURE CHANGE

Members of the trout family have fared well in the cold waters of the Flathead River. Aquatic insects thrive in these free flowing, low nutrient waters. But various activities have caused temperature changes in parts of the river system which threaten fish spawning activities and present serious problems to many lower forms of life as well. Temperature change is *serious*, a fact aptly illustrated by using cutthroat trout and mayflies as "biological indicators."

Each spring and early summer, cutthroat trout in Flathead Lake migrate to spawning tributaries. When water temperatures reach 40°F., spawning migration begins. A temperature alteration as seemingly minor as one degree can delay or possibly *stop* the spawning run.

Water discharge from Hungry Horse Dam usually ranges from 39-40°F. in the summer. Water temperatures in the river three miles below the discharge point depend on how much water is released from the reservoir. When water discharges reach 300 cubic feet per second or less, water temperature quickly approaches air temperature. Discharges above 300 cubic feet per second cause the temperature to remain at 39-40°F. because great amounts of cold water enter the river.

Flood control and hydroelectric production—not recreation or fisheries needs—determine the volume of water discharged. The problem is compounded because discharges from Hungry Horse Reservoir vary hourly as well as daily during all seasons.

The changing water levels also have a direct and indirect effect on organisms that live downstream—such as mayflies.

Approximately 50 species of mayflies thrive in the Flathead River Basin. Naturally, each has its own habitat requirements, including food, living space, temperature and water quality. For example, some prefer gravel areas of the stream bottom near the surface while others burrow into gravel beds about 20 feet below the river bed.

The mayfly larval stage is spent in an aquatic environment. They leave the water to mate, deposit

eggs in the stream and then die. Emergence from the water is triggered by a specific water temperature, with various species hatching from February to the autumn. Of course, changes in temperature of the natural water system affect emergence time.

Temperature changes in tributary spawning streams affect fish, as well as insects. In small spawning streams with streambank cover on both sides, water temperature would vary 2-3°F. in summer. With exposure to the sun, the temperature will fluctuate 5-10°F. The temperature of a stream completely exposed to the sun's heat by removal of vegetation on both banks could fluctuate 10-13°F. daily. Such changes create conditions which favor undesirable species of fish, i.e., squawfish or suckers.

In general, trout eggs develop and the young trout hatch according to water temperatures. Thus, temperature changes not only affect spawning emergence but also growth rates of fish, since fish fry depend on sequential insect hatches or plankton blooms to provide an adequate food supply. (Mayfly data supplied by Jack Sanford, University of Montana Biological Station, Yellow Bay.)

NUTRIENT LEVELS

Changes in nutrient levels are just as damaging as temperature changes, but perhaps not as obvious. Algae, plankton, aquatic invertebrates and certain insects form the food chain that supports fish. So changes in levels and types of nutrients can alter the aquatic environment and affect different fish species.

Certain kinds of algae and bacteria (sphaerotilos) are stimulated by the addition of specific nutrients and, in general, the higher the level of these nutrients, the higher the populations of algae and bacteria. The problem-causing algae and bacteria are stimulated to excessive growth by relatively high levels of phosphate, nitrates and other nutrients. In abundance, these algae and bacteria change the aquatic environment—which, in turn, affects insects, fish and man.

Nutrients originate from many different sources, including sewage that receives inadequate treatment in the valley's major communities, direct discharges adjacent to streambanks or lakes and ground water discharges into the stream from areas with poor facilities.

Livestock production also contributes to nutrient load increases. Concentration of livestock along streambanks contributes nutrients, not only by wastes but also by erosion of fragile soils directly into these streams. Trampling livestock erode trails on steep slopes which eliminate streambank vegetation.

CHANGING WATER LEVELS

Man-made dams, reservoirs and lake level control devices cause drawdowns and altered discharge and flow patterns, creating environmental problems for aquatic organisms.

Spawning fish and aquatic insects deposit eggs in shallow areas of streams, lakes and reservoirs. And shallow areas in lakes provide the basic needs for many aquatic insects. But eggs deposited and insect larvae living in shallow water face environmental catastrophe. Changes in water levels strand both insects and fish, competely eliminating populations, or seriously altering them.

Changing water levels also cause scouring of the streambed and adjacent banks. This creates siltation—probably the number one pollution problem in most of Montana.

SILTATION

In some tributaries of the Flathead system, siltation is serious enough to nearly eliminate successful spawning by trout. Soil erosion from roads, poor logging practices, excessive grazing and elimination of streambank vegetation, irrigation returns and channel changes contribute to silt loads in many of Montana's rivers.

In order to hatch and then escape, trout eggs demand a relatively high oxygen content in the water spaces they occupy between pieces of gravel. Sac fry also must have clean, well-oxygenated water. Silt, sifting into and filling the spaces between the gravel in spawning streams, eliminates oxygen and prevents the trout eggs from hatching.

WATER VELOCITY

Channel alterations cause velocity changes which create some unique problems—especially when they are combined with velocities that vary according to programmed releases from dams. If the water velocity is stronger than the ability of the trout to swim upstream, the fish are obviously unable to enter the tributaries for spawning.

Using culverts to channel streams under roads creates barriers to upstream migrating trout. Several Hungry Horse Reservoir tributaries were crossed by roads using culverts as bridging. Velocity from spring run-off cut deeply into the streambed downstream from the culvert, creating barriers for fish.

Many of these man-created barriers have been modified so that fish now can pass upstream. The FS cooperated with the department to install gabions (rock-filled wire baskets which slow down or divert stream flows) in downstream areas. Thus, the height of water outfall is reduced in a series of steps. Reservoir fish now can reach spawning tributaries.

In light of past successes of reclaiming waters where quality was impaired, the future doesn't look very optimistic. Within the last few years several new developments have been proposed in the Flathead River Basin that threaten its water. Additional dams and reservoirs on the North and Middle forks, cloudseeding, coal mining in the North Fork drainage and water diversion from the basin threaten the pristine and beautiful watershed.

How these potential problems are faced—and what is done about the immediate threats—will determine the fate of the waters of the Flathead.

THE WATERS OF THE FLATHEAD:

—deciding their future

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